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## **DECLARATION FOR THE RECORD OF DECISION**

### **SITE NAME AND LOCATION**

Pasley Solvents and Chemicals Site  
Town of Hempstead  
Nassau County, New York

### **STATEMENT OF BASIS AND PURPOSE**

This decision document presents the selected remedial action for the Pasley Solvents and Chemical Site (Site), which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document summarizes the factual and legal basis for selecting the remedy for this Site.

The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy. A letter of concurrence from NYSDEC is appended to this document.

The information supporting this remedial action decision is contained in the administrative record for this Site, an index of which is attached as Appendix 5.

### **ASSESSMENT OF THE SITE**

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment.

### **DESCRIPTION OF SELECTED REMEDY**

The remedy presented in this document addresses the treatment of soils and the ground water at the Pasley Solvents and Chemicals Site.

The major components of the selected remedy include:

- Treatment of approximately thirteen thousand (13,000) cubic yards of contaminated soil by soil vacuuming and/or by soil flushing;
- Disposal of treatment residuals at a RCRA Subtitle C facility;
- Remediation of the ground water by extraction/metals precipitation/air stripping with vapor phase granular activated carbon/GAC polishing/recharge;

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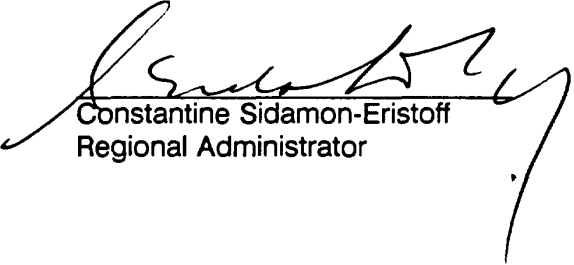
- Pumping of contaminated ground water from three extraction wells at combined flow rate of approximately 450 gpm. The actual pumping rate will be determined during the Remedial Design;
- Implementation of a long-term monitoring program to track the migration and concentrations of the contaminants of concern; and
- Implementation of a system monitoring program that includes the collection and analysis of the influent and effluent from the treatment systems and periodic collection of well-head samples.

#### **DECLARATION OF STATUTORY DETERMINATIONS**

This selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site. Because treatment is being used to address the principal threats at the Site, this remedy satisfies the statutory preference for treatment as a principal element of the remedy.

Due to the existence of an upgradient source of contamination, the selected ground water remedy, by itself, will not meet chemical-specific ARARs nor be capable of restoring the area ground water to applicable ground water quality standards until these upgradient source areas are removed.

As the remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted within five (5) years after commencement of the remedial action, and every five years thereafter, to ensure that the remedy continues to provide adequate protection of human health and the environment.

  
Constantine Sidamon-Eristoff  
Regional Administrator

9/24/92  
Date

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**DECISION SUMMARY**

**PASLEY SOLVENTS AND CHEMICALS SITE**

**TOWN OF HEMPSTEAD, NEW YORK**

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

**REGION II**

**NEW YORK**

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## **I. SITE LOCATION AND DESCRIPTION**

The Pasley Solvents and Chemicals Site (Site) is located at 556 Commercial Avenue, Town of Hempstead, Nassau County, New York. The Site lies between the borders of the political subdivisions of the Village of Garden City and Uniondale, in the Town of Hempstead (see Figure 1). The immediate area has light industrial and commercial properties; residential communities are located within 1/4 mile of the Site. The Site measures 75' by 275', and is fenced on the north, east and south. A building and loading platform border the Site to the west (see Figure 2).

According to the Town of Hempstead's Public Information Division, the population of the Town of Hempstead is approximately 735,000. The predominant form of land use in the vicinity is industrial with the nearest off-site building adjacent to the Site. It is estimated that 75 homes are located within a 1/4 mile radius of the Site and 1,800 homes within one mile of the Site. The only source of drinking water for residences in the Town of Hempstead is ground water. All public water supply wells in the Site area draw water from the deeper aquifer, the Magothy Aquifer. Four public water supply well fields are located within approximately 2 miles of the Site.

There are no surface water bodies or wetlands within the vicinity of the Site. There is no designated New York State Significant Habitat, agricultural land, historic or landmark site directly or potentially affected. There are no endangered species or critical habitats within close proximity to the Site.

## **II. SITE HISTORY AND ENFORCEMENT ACTIVITIES**

### **A. Site History**

The Site is a former tank farm used for the storage of oils, solvents and chemicals. From 1969 to 1982 the Site was occupied by Pasley Solvents and Chemicals Company (Pasley) and was used as a chemical distribution facility. The principal activity at the Site included the delivery of various chemicals to the Site, storage of chemicals in the tanks located there and eventual transfer of the chemicals to 55-gallon drums for delivery to customers. These chemicals reportedly included a wide range of aromatic and halogenated aliphatic hydrocarbons, various solvents, ketones and alcohols. Pasley also operated as a "scavenger" that transported waste and sludge, containing hazardous substances that may have been transported to the Site. The Site is owned by Commander Oil Corporation (Commander). Prior to 1969, the Site was occupied by Commander, which distributed fuel oils.

In response to Pasley's request for a New York State Department of Environmental Conservation (NYSDEC) permit to store and remove chemicals, the Nassau County Department of Health (NCDH) conducted a preliminary site inspection in 1980 and collected soil samples from the area beneath the above-ground storage tanks at depths ranging from six to 36 inches. The soil collected was contaminated with halogenated and non-halogenated hydrocarbons including trichloroethene (TCE), tetrachloroethene (PCE), 1,1,1-trichloroethane, xylene and

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toluene. These chemicals were being stored on-site at the time. NCDH then referred the Site to NYSDEC. NCDH and NYSDEC recommended that Pasley submit a plan for a Phase I and Phase II remedial investigation and a cleanup plan.

Lakeland Engineering of Port Washington (Lakeland), New York was hired by Pasley to perform a limited well drilling and ground water sampling program. In August 1981, Lakeland, through its subcontractor, Slack Well Drilling Company installed five (5) on-site monitoring wells. One additional monitoring well was installed off-site. Ground water samples were collected and samples from wells 2, 5, and 6 were analyzed by the NCDH as well as by Lakeland. Contaminants including methylene chloride, PCE, benzene, toluene and xylene were detected at levels exceeding State Drinking Water Standards.

A comparison of the two sets of data from NCDH and Lakeland showed widely divergent results. In February, 1982 Commander was notified by NCDH that the site investigation would continue. In May 1982, Pasley operations ceased when the company filed for bankruptcy.

NYSDEC and NCDH were unsuccessful in their efforts to persuade Commander and Pasley to do additional work at the Site. In 1983, NYSDEC issued a Notice of Hearing and Complaint alleging violations of the New York State Environmental Conservation Law, Articles 17, 27 and 71.

On June 10, 1986, the Site was placed on the National Priorities List (NPL). NYSDEC was the lead agency until January 1987. Then, with NYSDEC's concurrence, EPA assumed responsibility for the cleanup of the Site.

#### B. History of Surrounding Sites

Two major ground water contamination sites are adjacent to the Site. One is Roosevelt Field, a former airfield that is now a large shopping mall. The Roosevelt Field site was extensively studied by the United States Geological Survey (USGS) from 1982 to 1984. As a result of this study, the USGS identified three volatile organic ground water contamination plumes. Two of the contamination plumes exist in the Upper Glacial aquifer, and the third is present in both the Upper Glacial aquifer and the Magothy Formation. The plumes were reported in 1986 to extend at least 1,000 feet to the south-southwest of Roosevelt Field, and within 400 feet of the Pasley Site. The report states that the ground water in the Upper Glacial aquifer flows at approximately 1 ft./day. At that rate, it is likely that the plume is responsible for the contamination detected in the upgradient Pasley well cluster. The Roosevelt Field Site was listed as a Class II site on the New York State Registry in July 1991.

The Purex/Mitchell Field Transit Facility site (Purex) is the second major ground water contamination site in the area and is approximately 800 feet east of the Site. An investigation conducted by Camp, Dresser and McKee in 1984 showed that contaminants in the upper

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Magothy aquifer associated with the Purex Site include: PCE; TCE; 1,1-dichloroethene; and methylene chloride. The ground water contamination from this site is currently being remediated by the Purex company pursuant to a New York State Consent Order.

### C. Enforcement

EPA identified two potentially responsible parties (PRP's) as owners and/or operators. Special notice letters informing the PRPs of their potential liabilities were mailed on February 12, 1988 to Commander and Pasley for conducting a Remedial Investigation and Feasibility Study (RI/FS) for the Site. Several negotiations were held to discuss technical and legal issues relating to the Administrative Order on Consent (AO) for the conduct of the RI/FS.

On August 19, 1988, EPA entered into an AO, Index NO. II- CERCLA-80212, with Commander. The AO required Commander to perform an RI/FS to determine the nature and extent of contamination at the Site and to remove the 12 above-ground tanks that were located on-site. Pasley declined to participate in the settlement.

The tank farm removal was completed in November of 1988 by ABC Demolition and was supervised by EA Engineering, a former consultant of Commander. Metcalf & Eddy, Inc. performed the RI/FS for Commander. The RI Report was approved by EPA in November, 1991. The revised FS Report was submitted to EPA February, 1992.

In February, 1992 EPA sent information request letters regarding generation of wastes found at the Site to 20 parties.

### III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS Reports and the Proposed Plan for the Site were released to the public for comment on February 14, 1992. These two documents were made available at two information repositories maintained at the EPA Region II Office in New York City and the Nassau Library System. The notice of availability for these documents was published in Newsday on February 14, 1992. A public comment period on the documents was held from February 14, 1992 through March 15, 1992. In addition, a public meeting was held on March 5, 1992. At this meeting, representatives from EPA answered questions about problems at the Site and the remedial alternatives under consideration. Responses to the comments and questions are included in the Responsiveness Summary, which is attached as Appendix 4.

### IV. SCOPE AND ROLE OF RESPONSE ACTION

The objective of this remedy is to address the source of contamination at the Site, the contamination in the surface soils, and ground water contamination attributable to the Site. The selected remedy will treat ground water until the influent contaminant concentrations at the extraction wells equal the upgradient concentrations. For the soil remediation alternative, the

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contaminated soil will be treated until the recommended soil cleanup objectives as outlined in Table 13 are met or until no more VOCs can be effectively removed from the unsaturated zone.

Contamination upgradient of the Site is suspected to be contributing to the ground water contamination at the Site. The Roosevelt Field site, which is one of the major suspected sources of contamination detected in the Pasley upgradient Glacial aquifer ground water well, was listed as a Class II site on the New York State Registry in July 1991. The EPA and NYSDEC will ensure that any sources contributing to contamination at the Site are addressed. In addition, during the remedial design process, EPA and NYSDEC will also ensure that the effectiveness of the Pasley remediation is not influenced by the ground water recovery system at the adjacent Purex Site.

## **V. SUMMARY OF SITE CHARACTERISTICS**

### **A. Site Geology and Hydrology**

Based on soil borings performed during the field investigation, borings for the 30 foot monitoring wells and borings for the 60 foot monitoring wells, revealed only unconsolidated sands and gravels with some silty material at depth. The unconsolidated sediments encountered to a depth of 60 feet belong to the upper Pleistocene undifferentiated glacial outwash deposits or Upper Glacial aquifer. All of the 90 foot wells were screened in the upper portion of the Magothy aquifer (Upper Cretaceous). The Magothy formation consists of fine sand often containing thin, discontinuous layers of silt and clay. The thickness of the Magothy aquifer is estimated at 400 to 500 feet in the Pasley study area. The Upper Glacial aquifer overlies the Magothy aquifer and the two may act as distinct aquifers, or as one, depending upon the degree of hydraulic connection between the two. It is also reported that there is a downward ground water flow direction from the Glacial aquifer to the Magothy aquifer. This downward flow was not always evident throughout the Site. However, in the Site area, it is believed that the two are hydraulically connected. Ground water flows in the Upper Glacial aquifer in a southwesterly direction. The ground water in the Upper Magothy aquifer has a more southerly flow direction than in the Glacial aquifer.

### **B. Nature and Extent of Contamination**

#### **1. Ground Water**

Eighteen monitoring wells were installed to evaluate ground water conditions. The monitoring wells were clustered in six locations (three wells each, screened at depths of 30, 60, and 90 feet). The ground water quality of the aquifer underlying the Site, downgradient and upgradient of the Site was assessed by two rounds of water quality sampling in 1990 and a third round of partial sampling in 1991. The on-site shallow ground water monitoring well (MW-2S) indicated highest contamination as compared to the other seventeen monitoring wells. Tables 1 through 3 present the results of the three rounds of ground water sampling. As

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Tables 1 through 3 present the results of the three rounds of ground water sampling. As shown in these Tables, the most prevalent Volatile Organic Compound (VOC) was trans - 1,2-dichloroethene at a maximum concentration of 37,000 parts per billion (ppb).

A contaminant plume could not be defined by plotting the Total Volatile Organic Compounds (TVOC) associated with the Site study area. This was due in part to the fact that contamination was detected entering the Site at the upgradient well cluster, MW-1 (Figure 3). Therefore, a group of VOCs which were found at the Site but which were not detected in upgradient well cluster well MW-1 were chosen to define the plume associated with the Site.

The total volatile organic index compounds (TVOIC) chosen to define the plume for the Site are the following: chloroform, 1,1 dichloroethene, 1,1 dichloroethane, trans - 1,2-dichloroethene, 1,1,1 trichloroethane, ethylbenzene, toluene, chlorobenzene, and xylene. The TVOIC compounds were found to contribute a major part (88%) of the contamination found in the monitoring well cluster located on-site (MW-2). However, the use of TVOIC does not imply that non-index compounds (TCE, PCE) are absent from the Site.

Through the use of the index compounds, a well defined contaminant plume could be identified for the Site. Figures 4 through 6 display the plume detected based on the data collected.

Figure 4 is a map of the TVOIC plume for the 20 to 30 foot depth in the Upper Glacial aquifer. It appears that the contaminant plume extends approximately 400 feet to the southwest, parallel to the ground water flow direction and the contaminant plume is approximately 390 feet wide. The maximum level of TVOC contamination detected was 37,000 ppb for trans - 1,2, dichloroethene, 370 times the Federal MCL. TCE, although not part of the TVOIC plume, was also detected at a maximum concentration of 320 ppb, 64 times the federal MCL.

Figure 5 is a map of the TVOIC plume for the 50 to 60 foot depth in the Lower Glacial aquifer. The areal extent of the plume at this depth was found to be much smaller, and centered on MW-4I, directly downgradient of the Site. The maximum level of TVOIC contamination in this portion of the plume was 15 ppb for trans-1,2, dichloroethene. TCE was also detected at 15 ppb.

Figure 6 is a map of the TVOIC contamination plume for the 80 to 90 foot depth in the Upper Magothy aquifer, directly downgradient of the Site. No TVOIC contamination was found directly downgradient or on-site. However, 13 ppb of a TVOIC (trans-1,2, dichloroethene) was found at the eastern edge of the study area at monitoring wells MW-3D and MW-5D. This contamination did not appear to result from the Site and did not follow the south southwesterly direction of ground water flow from the Site.

Samples collected from upgradient off-site monitoring wells showed a maximum level of 27 ppb of PCE (monitoring well location MW-1S) and 15 ppb for TCE (monitoring well location MW-1D). Benzene was also detected at a maximum level of 38 ppb (monitoring well location MW-1I).

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Semi-volatile compounds were detected at low levels in the ground water. The only metal detected above the MCL was chromium at 255 ppb.

## 2. Soils

Fifty (50) surface soil grab samples were collected and analyzed for volatile organic compounds. These samples were collected from an approximate 30 foot grid pattern at a depth of 6 to 12 inches below grade. Samples were then collected and composited for metals and semi-volatile organic analyses. Each composite sample consisted of soil from five adjacent discrete sample locations. Figure 7 illustrates surface soil sampling locations. There were eight VOCs that appeared at high concentrations in the surface soil that were also detected in the ground water. These were trans-1,2-dichloroethene, 1,1,1-trichloroethane, TCE, PCE, toluene, xylenes, ethylbenzene and chloroform.

Data from the surface soil samples revealed elevated levels of VOCs originating from three primary locations. The concentrations of TVOCs, primarily PCE and trans-1,2-dichloroethene, were detected in concentrations of 1,000 ppb up to concentrations of 603,000 ppb. Additionally, total semi-volatile organic compounds were detected in composite samples collected from ten locations. The highest concentrations of total semi-volatiles were detected in composite samples 8 and 9 (204,000 ppb and 126,500 ppb, respectively) collected on the eastern edge of the Site. The results of the analyses for the soil samples collected are presented in Table 4 .

Subsurface samples were also collected from eight locations on-site and five locations off-site.

On-site, two samples were collected from each of eight borings at depths of 12 to 14 feet and 23 to 25 feet (or the first two feet below the water table). A total of sixteen samples were collected. These boring locations are identified on Figure 8. Boring BH-8 was subsequently converted into a 90 foot deep monitoring well (MW-2D).

Table 5 contains the results of the on-site subsurface soil samples. Elevated levels of total VOCs (greater than 1,000 ppb) were detected in six of the sixteen samples. Table 6 identifies the boring number, depth, primary contaminant detected and total VOC concentrations.

Analytical results for semi-volatile compounds indicated that two of the eight samples collected at the 12 to 14 foot depth exhibited elevated total semi-volatile concentrations (12,500 ppb at BH-2A, and 18,000 ppb at BH-3A). There was only one location (BH-7B) that exhibited a total semi-volatile concentration greater than 10,000 ppb (12,710 ppb) at the 23 to 25 feet depth. This data suggest limited downward migration of semi-volatile compounds. The ground water data supports this. MW-2S (the 30 foot shallow well) exhibited 380,000 ppb of total semi-volatile compounds but MW-2I (the 60 foot intermediate well) and MW-2D (the 90 foot well) did not exhibit any semi-volatile contamination.

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The levels of metals in the subsurface on-site samples were within the common range for soil and were not significantly different from the off-site results.

## **VI. SUMMARY OF SITE RISKS**

EPA conducted a Risk Assessment of the "no-action" alternative to evaluate the potential risk to human health and the environment associated with the current conditions. The Risk Assessment began by selecting chemicals of concern that would be representative of site risks. These chemicals were identified based on factors such as potential for exposure to receptors, toxicity, concentration and frequency of occurrence. Table 7 summarizes the chemical of potential concern selected for each sampled media at the Site. The frequency of detection and concentration range for the contaminants of concern are referenced in Table 8 .

EPA's Risk Assessment identified several potential exposure pathways by which the public may be exposed to contaminants released from the Pasley site under current and future land-use scenarios. The actual and potential pathways and population potentially affected are shown in Table 9 .

Since access is restricted to the public and the Site is covered by gravel, it is not considered likely that direct contact with the contaminated soil would occur. Therefore, the only complete exposure pathway under current land use conditions is inhalation exposure to chemicals that volatilize from the soil. The reasonable maximum exposure was evaluated. The following pathways were selected for evaluation under the future land use conditions:

- direct contact and incidental ingestion exposure with chemicals present in surface soils,
- ingestion exposures to chemicals present in ground water,
- ingestion and inhalation exposures during home use to chemicals present in ground water, and
- inhalation exposures to chemicals that have volatilized from surface soils.

The potentially exposed populations in all cases were the residents (adult and children) of the neighborhood surrounding the Site and future workers on-site.

Under current EPA guidelines, the likelihood of carcinogenic (cancer causing) and non-carcinogenic effects due to exposure to site chemicals are considered separately. It was assumed that the toxic effects of the site-related chemicals would be additive. Thus, carcinogenic and non-carcinogenic risks associated with exposures to individual compounds of concern were added to indicate the potential risks associated with mixtures of potential carcinogens and non-carcinogens, respectively.

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Non-carcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and safe levels of intake, or Reference Doses (RfDs). RfDs have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of mg/kg-day, are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) are compared with the RfD to derive the hazard quotient for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds across all media that impact a common receptor.

An HI greater than 1 indicates that the potential exists for non-carcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The RfDs for the chemicals of potential concern at the Pasley site are presented in Table 10.

A summary of the non-carcinogenic risks associated with the chemicals of potential concern across various exposure pathways is found in Table 11. It can be seen from Table 11 that the greatest non-carcinogenic risk from the Site is associated with ingestion of on-site Upper Glacial aquifer water by on-site workers. The noncarcinogenic effects, exceed 1.0 due primarily to chromium and TCE. The hazard index for soil was calculated to be less than 1.0.

Potential carcinogenic risks were evaluated using the cancer slope factors (Sfs) developed by EPA for the chemicals of potential concern. Sfs have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor (CRAVE) for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. Sfs, which are expressed in units of (mg/kg-day)<sup>-1</sup>, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely. The SF for each indicator chemical is presented in Table 8.

For known or suspected carcinogens, EPA considers excess upper bound individual lifetime cancer risks of between  $10^{-4}$  to  $10^{-6}$  to be acceptable. This level indicates that an individual has not greater than a one in ten thousand to one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at the Site. The total cancer risks at the Pasley Site are outlined in Table 9. The total cancer risk for on-site occupants is  $4 \times 10^{-4}$ , based on ingesting untreated ground water from the Upper Glacial aquifer in the vicinity of the Site. The total cancer risk for children is  $9 \times 10^{-4}$  in the vicinity of the Site, based on ingesting untreated ground water from the Upper Glacial aquifer.

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The cumulative upperbound risks at the Site for on-site occupants under a future potential land use scenario associated with ground water is  $9 \times 10^{-4}$  which exceed EPA's risk criteria. In addition, MCLs are currently exceeded for several hazardous substance in ground water. Although the risk posed by the soils are within EPA's acceptable risk criteria, contaminants in the soils, if not addressed, will likely continue to contribute to further contamination of the ground water at the Site.

## UNCERTAINTIES

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of potential concern, the period of time over which such exposure would occur, and in the models used, to estimate the concentrations of the chemicals of potential concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the Risk Assessment provides upper bound estimates of the risk to populations near the site.

A specific uncertainty inherent in the Site risk assessment is that the methodology used to calculate the site risks are site-wide averages, which give a clear overall understanding of site risks. However, as previously stated, EPA has taken into account the sensitivity of the on-site and neighboring populations and has determined that the target risk for the site should be on the order of  $10^{-6}$ .

Therefore, actual or threatened releases of hazardous substances from this site, if not addressed by the selected alternative or one of the other remedial measures considered, may

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present an imminent and substantial endangerment to the public health, welfare, and the environment. More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the Risk Assessment which can be found in the Administrative Record.

## **VII. DESCRIPTION OF ALTERNATIVES**

Two media-specific remedial actions are required to protect human health and the environment because of the nature of the contamination at the Site. They are numbered to correspond with their presentation in the FS report. On-site soil has been determined to be a source of contamination. Contaminants were found to move from the unsaturated soil to the ground water. Once in the ground water, the contaminants, under the influence of the ground water gradient, migrate from the Site to potential receptors.

Specific remedial action objectives for this Site include:

Ground water - Restoration of ground water quality to its intended use (Class IIb and GA-potential of drinking water) by reducing contaminant levels below State and Federal drinking water standards where possible (see Table 12). In the case where upgradient concentrations prohibit such restoration for a particular compound, the contaminant level will be reduced to the upgradient level.

Soil - In order for the soil not to be a contributor to ground water contamination, the degree to which the contaminants have to be reduced is different for each component (see Table 13). For VOCs (components of interest, trans-1,2-dichloroethene, 1,1,1-trichloroethane, TCE, PCE, toluene and, xylenes), the contaminated soil will be treated until the recommended soil cleanup objectives are met or until no more VOCs can be effectively removed from the unsaturated zone. For the semi-volatile compounds of interest, the contaminants di-n-butyl phthalate, naphthalene, bis-(2-ethylhexyl) phthalate and floranthene have to be reduced below 50 ppm.

The time to implement refers only to the actual construction and remedial action (time to achieve clean up) time and excludes the time needed to design the remedy, procure contracts, and negotiate with the PRPs, all of which can take 15-30 months.

The alternatives identified for both soil and ground water are presented below:

### **Soil Remediation Alternatives:**

#### **Alternative 1: No Action**

CERCLA requires EPA to consider the "No Action" alternative at every Superfund site to provide a baseline of comparison among alternatives. Under this alternative, the contaminated soil would be left in place without treatment. A long-term monitoring program would be implemented to track the migration of contaminants from the soil into the ground water. In

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accordance with Section 121 of CERCLA, remedial actions that leave hazardous substances above health-based levels at a site are to be reviewed at least once every five years to assure that the action is protective of human health and the environment. Accordingly, the no action alternative would have to be reviewed by EPA at least once every five years.

Capital cost: \$0  
Annual Operation  
& Maintenance: \$7,000  
30-year Present  
Worth: \$66,000

Time to Implement:  
Construction: 2 Months  
Remedial Action: 30 years

Alternative 2- Excavation with Off-site Disposal

This alternative involves the excavation and off-site disposal of the contaminated soil from the eastern and western portions of the Site.

The soil excavation would extend to a depth of 2 feet on the eastern section of the Site, and to a depth of 20 feet on the western portion of the Site, where the soils are highly contaminated. Approximately 10,083 cubic yards of soil contaminated with volatile organic and semi-volatile organic compounds would be excavated and the excavated soil would then be disposed of off-site at a RCRA-permitted landfill.

However, the soil will be tested using the Toxicity Characteristic Leaching Procedure (TCLP), to determine if treatment is necessary prior to disposal to insure that RCRA land disposal restrictions are met. The Land Disposal Restrictions set treatment standards which are based on the best demonstrated available technology (BDAT) for treatment of a given waste. In the case of VOCs in soil, the BDAT treatment method is generally incineration. If incineration is necessary to meet the Land Disposal Restriction's, a dry ash material would be produced which may require further RCRA-permitted disposal to protect the environment. This alternative would then be essentially equivalent to Alternative 3. The actual quantity of soil requiring treatment would be refined during the remedial design.

Capital cost: \$8,675,000  
Annual Operation  
& Maintenance: \$0  
Present Worth: \$8,675,000

Time to Implement: 1-2 Months

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Alternative 3- Excavation with Off-site Incineration

This alternative involves the same excavation of contaminated soil as described in Alternative 2. However, the excavated soil would be transported to an off-site facility for incineration. This alternative produces a dry ash material high in metals that would require further RCRA-permitted disposal to protect the environment.

Capital cost: \$43,970,000  
Annual Operation  
& Maintenance: \$0  
Present Worth: \$43,970,000

Time to Implement: 1-2 Months

Alternative 4- Excavation with Solidification/Stabilization

This alternative involves the same excavation of contaminated soil described in Alternatives 2 and 3. However, instead of transporting the soil off-site for treatment/disposal, the solidification/ stabilization process would involve construction of a treatment facility on-site.

The process would involve mixing of the excavated contaminated soils with a solidifying matrix to bind chemically the contaminants to form a "soil concrete." A solidifying matrix might include the use of lime, fly ash or cement to bind the contaminants in a solid block of treated soil. After the soils have been mixed with the solidification matrix, the resulting concrete-like substance would be placed back on the Site for hardening and final compaction.

Before the treatment technology is applied to the area, a treatability study would be performed on the soil to determine the effectiveness of different binders and to obtain additional information required for the development of preliminary design considerations.

Capital cost: \$2,108,000  
Annual Operation  
& Maintenance: \$0  
Present Worth: \$2,108,000

Time to Implement: 6 - 8 Months

Alternative 5- Soil Flushing

This alternative would work in conjunction with the selected ground water remedial alternative. This alternative entails installation of an infiltration system to effect soil flushing for removing the VOCs and semi-volatile organics from the soil. This process would involve injection of water or an aqueous solution into the area of soil contamination utilizing infiltration trenches. The

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injected water would flush the soil contamination into the ground water. The contaminated ground water would be pumped to the surface, treated and recharged to continue the process.

The infiltration trench system would consist of 3 excavated trenches approximately 2 feet in depth backfilled with a coarse stone aggregate. The treated water from the ground water treatment system would be distributed through the gravel trenches by a 4 inch PVC perforated pipe. The 3 trenches would transverse the length of the site and have 20 foot spacing between each trench. The aggregate fill material for the infiltration trenches would be completely surrounded with filter fabric to prevent soil movement into the aggregate. An observation well would be installed in each infiltration trench.

The organic contaminants in the soil at the Site have high solubilities in water and are therefore expected to be flushed from the soil using treated ground water as the washing agent.

Capital cost:	\$137,000
Annual Operation & Maintenance:	\$15,000
Present Worth:	\$185,000

Time to Implement:	
Construction:	6 Months
Remedial Action:	4 Years

#### Alternative 6- Soil Vacuuming

Soil vacuuming would involve the installation of vents in the contaminated unsaturated soil zone. A vacuum would be applied through these vents to volatilize and extract organic compounds from the soil. The organic vapors would be drawn into a collection system where they would be removed through an activated carbon off-gas treatment system. Circulation of air through the soil also would enhance the biodegradation of semi-volatiles in the unsaturated zone.

A small amount of liquid condensate would be generated during the vapor extraction process. With an on-site ground water treatment alternative operating in conjunction with ground water remediation, the condensate may be treated on-site at minimal cost. Off-site disposal of condensate would be necessary if this alternative was implemented before a ground water treatment system was constructed.

Under this alternative approximately thirteen thousand (13,000) cubic yards of contaminated soil would be treated until no more VOCs can be effectively removed from the unsaturated vadose zone.

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Subsurface soil sampling would be required to monitor the progress of the soil vapor extraction process.

Capital cost: \$882,000  
Annual Operation  
& Maintenance: \$664,000  
Present Worth: \$1,562,000

Time to Implement:  
Construction: 6 Months  
Remedial Action: 2 Years

#### Alternative 7- Soil Vacuuming and Soil Flushing

This alternative combines Alternatives 5 and 6. The soil flushing technology would remove most volatile and semi-volatile compounds but may not be as effective in removing a group of volatile compounds known as monocyclic aromatic hydrocarbons. Soil vacuuming, however, would perform well in removing monocyclic and aliphatic hydrocarbons but may not be as effective for semi-volatile compounds. However, it should be noted that the circulation of air through the soil as part of the vacuuming procedure would enhance the biodegradation of the semi-volatiles in the soil.

Under this alternative, soil vacuuming would be performed initially to remove the volatile and semi-volatile compounds. A soil sampling and analysis program would then be implemented to evaluate the success of the soil vacuuming. Soil flushing, used to flush any remaining water-soluble contaminants from the soil, would be performed after soil vacuuming to achieve soil cleanup goals. However, if it is found after the soil vacuuming that concentrations of semi-volatile compounds are decreasing in the soil and are not impacting ground water, the soil flushing technique may be abandoned. Periodic subsurface soil sampling and analysis would be required to monitor the progress of both processes.

Capital cost: \$921,000  
Annual Operation  
& Maintenance: \$407,000  
Present Worth: \$1,649,000

Time to Implement:  
Construction: 1 Year  
Remedial Action: 6 Years

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**Ground Water Treatment Alternatives:**

All of the remedial ground water alternatives, except the No Action alternative, involve extraction, treatment and recharge of the treated water to the ground water. The contaminated ground water is recovered using extraction wells at the downgradient end of the contaminant plume. The extracted ground water is treated and returned to the aquifer via a series of recharge wells located upgradient of the contaminant plume and/or infiltration trenches located in the area of soil contamination.

Recent studies have indicated that pumping and treatment technologies may contain uncertainties in achieving the ppb concentrations required under ARARs over a reasonable period of time. However, these studies also indicate significant decreases in contaminant concentrations early in the system implementation, followed by a leveling out. For these reasons, the selected ground water treatment alternative stipulates contingency measures, whereby the groundwater extraction and treatment system's performance will be monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Modifications may include any or all of the following:

- a) at individual wells where cleanup goals have been attained, pumping may be discontinued;
- b) alternating pumping at wells to eliminate stagnation points;
- c) pulse pumping to allow aquifer equilibration and to allow adsorbed contaminants to partition into groundwater; and
- d) installation of additional extraction wells to facilitate or accelerate cleanup of the contaminant plume.

If it is determined, on the basis of the preceding criteria and the system performance data, that certain portions of the aquifer cannot be restored to their beneficial use in a reasonable time frame, all or some of the following measures involving long-term management may occur, for an indefinite period of time, as a modification of the existing system:

- a) engineering controls such as physical barriers, source control measures, or long-term gradient control provided by low level pumping, as containment measures;
- b) chemical-specific ARARs may be waived for the cleanup of those portions of the aquifer based on the technical impracticability of achieving further contaminant reduction;

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- c) institutional controls, in the form of local zoning ordinances, may be recommended to be implemented and maintained to restrict access to those portions of the aquifer which remain above remediation goals;
- d) continued monitoring of specified wells; and
- e) periodic reevaluation of remedial technologies for groundwater restoration.

The decision to invoke any or all of these measures may be made during a periodic review of the remedial action, which will occur at intervals of no less often than every five years.

Alternative 1- No Action

CERCLA, as amended, requires that the "no-action" alternative be considered at every site. Under this alternative, no remediation measures would be implemented at this time. This alternative allows for natural attenuation of the contaminants and includes institutional controls and monitoring. This alternative also would include restrictions on future ground water use and a public awareness program.

Periodic ground water sampling and analysis would be required to monitor the progress of natural attenuation. In effect, this no action alternative is essentially equivalent to the no action alternative under the soil remediation alternative section of this ROD.

Capital cost:	\$0
Annual Operation	
& Maintenance:	\$7,000
10-year	\$43,000
30-year Present	
Worth:	\$66,000

Time to Implement:

Construction: 2 Months

Remedial Action: 30 Years

Alternative 2- Metals Precipitation/ Powdered Activated Carbon Treatment (PACT)/GAC Polishing

This alternative utilizes three collection wells for the extraction of contaminated ground water followed by on-site treatment. To contain and remove ground water from the contamination plume, it is estimated that it would be necessary to pump 450 gallons per minute (GPM) from three extraction wells placed at depths of 60 feet. Ground water would be pumped from the extraction well system to a holding/ equalization tank. The pumped ground water would then enter the treatment plant where it would go through an initial two-stage precipitation

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and clarification/filtration unit for the removal of all heavy metals. The heavy metals treatment would be followed by powdered activated carbon treatment (PACT) to remove volatile organic and semi-volatile organic compounds.

The granular activated carbon (GAC) adsorption system that follows the PACT would be used, if necessary, as a final polishing step to remove any remaining organic compounds in order to achieve ARARs. Carbon adsorption would remove organic compounds from waste water onto the activated carbon. The exact amount of treated water that would be recharged to the ground water either by the recharge wells or by the infiltration trenches would be determined in the remedial design.

The by-products resulting from the treatment system include metals sludge, filtered solids, and spent granular activated carbon. The sludge would be transported off-site for treatment and disposal at a RCRA-permitted facility.

Periodic sampling and analysis of the influent and effluent would be required to monitor the progress of this treatment alternative.

Capital cost: \$6,465,000  
Annual Operation  
& Maintenance: \$1,623,000  
10-year Present Worth: \$16,438,00  
30-year Present Worth: \$ 21,765,000

Time to Implement:  
Construction: 6 Months  
Remedial Action: 10-40 Years

Alternative 3- Metals Precipitation/Air Stripping with Fume Incineration/Granular Activated Carbon(GAC) Polishing

Under this alternative, the same extraction system is used to withdraw the contaminated ground water as that of Alternative 2. This alternative differs in that after metals removal, the effluent from the metals system would be pumped into an air stripper that would be effective in removing the VOCs from the water. Air stripping is a mass transfer process in which volatile contaminants in water are transferred to the gaseous phase.

Fume incineration would be used to treat any gaseous discharge from the air stripper. Fume incineration units are chambers heated by supplemental fuel which provide high enough temperatures and retention time to combust the contaminants in the off-gas. Temperatures in the combustion chamber range from 1200°F to 1800°F.

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The liquid phase from the air stripper would be pumped into the granular activated carbon (GAC) adsorption system that would be used as a final polishing step to remove any remaining organic compounds. Treatment residuals include spent carbon from the fume incinerator and spent carbon from the liquid phase carbon polishing.

Periodic sampling and analysis of the influent and effluent would be required to monitor the progress of the treatment alternative. During the periodic sampling and analyses of the influent, if it is determined that metals concentrations are below standards and low enough not to cause malfunction of the air stripper, the metals precipitation portion of the treatment train may be eliminated.

Capital cost: \$3,199,000  
Annual Operation  
& Maintenance: \$1,069,000  
10-year Present Worth: \$9,768,00  
30-year Present Worth: \$13,276,000

Time to Implement:  
Construction: 2 Years  
Remedial Action: 10-40 Years

Alternative 4-Metals Precipitation/Air Stripping with Vapor Phase Granular Activated Carbon/GAC Polishing

This treatment alternative is the same as Alternative 3 except that the off-gas emissions from the air-stripper would be treated by passing the air stream through vapor phase carbon adsorption columns, instead of the fume incinerator. In this alternative, contaminated air flows through the columns or carbon bed, and organics adsorb onto the carbon. The treated air then leaves the carbon bed with reduced concentrations of contaminants until the carbon adsorbent cannot take on additional organics. Removal efficiencies utilizing vapor phase activated carbon have been reported at greater than 98 percent.

Additional sludges would be generated from the carbon adsorption columns.

Capital cost: \$4,280,000  
Annual Operation  
& Maintenance: \$829,000  
10-year Present Worth: \$9,374,000  
30-year Present Worth: \$ 12,095,00

Time to Implement:  
Construction: 2 Years  
Remedial Action: 10-40 Years

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#### Alternative 5- Metals Precipitation/UV Peroxidation

Under this alternative, the same extraction system is used to withdraw the contaminated ground water as that of Alternative 2. UV Peroxidation is an innovative technology for cleanup and destruction of organic compounds in ground water. In this process, ultraviolet light reacts with hydrogen peroxide to form hydroxyl radicals. These powerful chemical oxidants then react with the organic contaminants in water. The end products of the oxidation process are carbon dioxide (CO<sub>2</sub>), water, and hydrochloric acid. Chemical oxidation would reduce the toxicity and volume of contaminated ground water at the Site.

Periodic sampling and analysis of the influent and effluent would be required to monitor the progress of this treatment alternative.

Capital cost: \$4,421,000  
Annual Operation  
& Maintenance: \$1,459,000  
10-year Present Worth: \$13,386,000  
30-year Present Worth: \$18,175,000

Time to Implement:  
Construction: 1 Year  
Remedial Action: 10-40 Years

#### VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, a detailed analysis of each alternative is required. The purpose of the detailed analysis is to assess objectively the alternatives with respect to nine evaluation criteria that encompass statutory requirements and include other gauges of the overall feasibility and acceptability of remedial alternatives. This analysis is comprised of an individual assessment of the alternatives against each criterion and a comparative analysis designed to determine the relative performance of the alternatives and identify major trade-offs, that is, relative advantages and disadvantages, among them.

The nine evaluation criteria against which the alternatives are evaluated are as follows:

Threshold Criteria - The first two criteria must be satisfied in order for an alternative to be eligible for selection.

**1. Overall Protection of Human Health and the Environment:**

This criterion addresses whether or not a remedy provides adequate protection and describes how risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

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**2. Compliance with ARARs:**

This criterion addresses whether or not a remedy will meet all the ARARs of other federal or State environmental statutes and/or provide grounds for invoking a waiver.

Primary Balancing Criteria - The next five "primary balancing criteria" are to be used to weigh major trade-offs among the different hazardous waste management strategies.

**3. Long-term Effectiveness and Permanence:**

This criterion refers to the ability of the remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

**4. Reduction of Toxicity, Mobility, or Volume:**

This criterion addresses the degree to which a remedy utilizes treatment technologies to reduce the toxicity, mobility, or volume of contaminants.

**5. Short-term Effectiveness:**

This criterion considers the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are met.

**6. Implementability:**

This criterion examines the technical and administrative feasibility of a remedy, including availability of materials and services needed to implement the chosen solution.

**7. Cost:**

This criterion includes capital and O&M costs.

Modifying Criteria - The final two criteria are regarded as "modifying criteria," and are to be taken into account after the previous criteria have been evaluated. They are generally to be focused upon after public comment is received.

**8. State Acceptance:**

This criterion indicates whether, based on its review of the FS and Proposed Plan, the State concurs with, opposes, or has no comment on the proposed alternative.

**9. Community Acceptance:**

This criterion indicates whether, based on its review of the FS and Proposed Plan, the public concurs with, opposes, or has no comment on the proposed alternative. Comments received during this public comment period, and the EPA's responses to those comments, are summarized in the Responsiveness Summary which is appended to this ROD.

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The following is a summary of the comparison of each alternative's strengths and weaknesses with respect to the nine evaluation criteria.

## **1. Overall Protection of Human Health and the Environment**

### **Soil Remediation Alternatives**

All the soil remediation alternatives are considered protective of human health and the environment except Alternative 1. Alternative 1 is not protective of human health and the environment because it does not eliminate, reduce or control the contaminants at the Site. Since it does not meet this threshold criterion, Alternative 1 will not be discussed further.

Alternatives 2 and 3 would not require any long term maintenance or deed restrictions. However, Alternatives 2 and 3 involve transportation of contaminated soil off-site, and increase the potential risks associated with dust generated during excavation and/or transportation. Alternative 4 would require long-term monitoring to ensure the stability of the solidification/stabilization process. Alternatives 5, 6, and 7 reduce potential human health risks by utilizing treatment to remove contaminants from the soil.

### **Ground Water Treatment Alternatives**

All the ground water alternatives, except the No Action alternative, are considered protective over the long term and would provide overall protection by effectively removing contaminants so that the ground water could be used for potable purposes, if desired. All the treatment alternatives would result in permanent protection of human health and the environment through the reduction in toxicity, mobility, and volume of the contaminants.

However, Alternative 2, by using the PACT system, has a disadvantage over Alternatives 3, 4, and 5, namely, additional sludges would be produced with the activated carbon system thus posing an added minor risk to workers and the environment, especially during the transportation of the sludges for disposal off-site.

Alternatives 3 and 4 pose additional risks associated with air emissions. However, the vapor phase treatment would eliminate any risk associated with air emissions. Alternative 5, by using UV peroxidation has certain advantages over the other alternatives, since it would provide complete destruction of VOCs, thus reducing waste sludges that would otherwise require further treatment and disposal.

## **2. Compliance With ARARs**

### **Soil Remediation Alternatives**

There are no chemical-specific ARARS for soils. It is anticipated that any action specific ARARS

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associated with soil treatment can be met by each alternative. However, Alternative 4 would require that treated soil be tested using the Toxicity Characteristic Leaching Procedure (TCLP), before backfilling, to insure that RCRA land disposal restrictions are met. At this point in time, a determination cannot be made whether these levels can be met. If levels cannot be met, a treatability variance may be required.

#### Ground Water Treatment Alternatives

Alternatives 2 through 5 achieve ARARs to a similar degree. None of the alternatives would achieve chemical-specific ARARs for ground water as a potential drinking water supply. Achieving chemical-specific ARARs for ground water is dependent on remediation of upgradient sources. This is due to the fact that regardless of the Site cleanup, upgradient sources will continue to be a source of contamination to the ground water beneath the Pasley Site. EPA believes that the proposed remedial action will result in attainment of chemical specific ground water ARARs providing upgradient sources are remediated so that they no longer impact the Upper Glacial aquifer.

EPA may invoke a technical waiver of the chemical-specific ARARs if the remediation program indicates that reaching MCLs in the glacial aquifer is technically impracticable due to the presence of upgradient sources.

Until upgradient sources are remediated so that they no longer impact the Site, EPA will attain ground water cleanup levels which are equal to upgradient concentrations. The remedial action will attain ground water cleanup levels equal to upgradient concentrations for certain contaminants.

Alternatives 2 through 5 would meet action-specific ARARs as outlined in Table 2-1 of the FS Report. Under these alternatives, treated ground water would meet pertinent federal and state ARARs.

### 3. Long-term Effectiveness

#### Soil Remediation Alternatives

Alternatives 5, 6 and 7 afford a greater degree of long-term effectiveness and permanence than Alternatives 2 or 4. Alternative 4 would require institutional controls for land use, which would need to be enforced for complete effectiveness.

Alternative 3 is the only alternative that removes all contaminants from the Site and provides total destruction of the contamination sources.

#### Ground Water Treatment Alternatives

Long-term effectiveness of the ground water alternatives requires the remediation of upgradient contamination. Alternatives 2 through 5 provide long-term effectiveness because these alternatives are designed to reduce contaminant concentrations in the treated ground water to levels that are protective of human health and the environment before discharge. Alternative 1 may present a long-term risk because it relies on natural attenuation to reduce contaminant concentrations.

#### 4. Reduction of Toxicity, Mobility, or Volume

##### Soil Remediation Alternatives

Alternative 2 does not utilize treatment to reduce the toxicity, mobility or volume of the contaminants. Alternative 3, excavation and off-site incineration, would provide the greatest degree of destruction of contaminants and therefore, the greatest degree of reduction of toxicity, mobility, and volume. However, Alternative 3 would produce ash that would require disposal. In addition, Alternative 4 would not cause a reduction in toxicity but would result in a reduction in mobility. Alternative 4 would increase the soil volume by the introduction of a solidifying matrix.

Alternatives 5 and 6 may not provide as great a degree of contaminant destruction or reduction in contaminant mobility as Alternatives 3 and 4, respectively. However, they are expected to provide an adequate degree of contaminant destruction by gradual reduction of mobility, toxicity and volume. Alternatives 5 and 7 involves soil flushing and must be done in conjunction with ground water extraction and treatment. These technologies used in combination would provide sufficient reduction of mobility, toxicity and volume.

##### Ground Water Treatment Alternatives

Alternatives 2 through 5 would control the mobility of contaminants contributed by the Site. These alternatives also would significantly reduce or eliminate the toxicity and volume of contaminated ground water by treatment to remove metals, semi-volatile and volatile organic compounds.

However, Alternative 5 by utilizing the UV peroxidation is more advantageous than Alternatives 2 through 4 because it provides a total chemical breakdown of the VOCs into less toxic compounds without any accumulation of sludges and waste residuals.

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## **5. Short-term Effectiveness**

### **Soil Remediation Alternatives**

Alternatives 2, 3, and 4, the excavation alternatives, may potentially increase the risk to the community during their implementation because they remove contaminants and create new potential exposure routes not identified in the Risk Assessment. However, necessary measures, such as implementation of proper safety procedures and on-site monitoring would be taken to minimize any significant risk from exposure to the contaminants.

Alternatives 5, 6 and 7 would have the least short-term effect on the community during implementation, since they would be conducted in-situ. All the alternatives have minor short-term effects on the surrounding community, including increased vehicular traffic, a slight increase in noise level from construction equipment, and fugitive dust emissions.

### **Ground Water Treatment Alternatives**

The extraction and treatment alternatives for ground water involve little disturbance to contaminated subsurface areas; therefore the potential risks to site workers and the surrounding community are minor and can be managed. The potential short-term risks to human health and the environment are also anticipated to be low for each of these alternatives.

## **6. Implementability**

### **Soil Remediation Alternatives**

All the alternatives are technically and administratively feasible. Of the soil remediation alternatives, Alternatives 2 and 3 would require the least time to implement. Alternative 4 would take more time to implement since it would require a treatability study and special equipment to treat the soils.

The potential impacts that Alternatives 5 and 7 may have on ground water flow regimes make these alternatives more complex and difficult to implement than Alternative 6. The soil flushing alternatives, Alternatives 5 and 7, require coordination with the ground water treatment alternative.

### **Ground Water Treatment Alternatives**

The treatment components of Alternatives 2 through 4 are proven effective for all contaminants of concern and should be easiest to implement because they rely on well understood and readily available commercial components. Alternative 5 relies on an innovative technology for treatment. Treatability studies would be required to determine the level of effectiveness that can be provided by this technology.

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## 7. Cost

Individual cost breakdowns are included in the Description of Alternatives section of this ROD. Capital cost is the value for building the remedial action. Annual operation and maintenance (O&M) costs are used to quantify the yearly expense of O&M. The 30 year present worth cost is then calculated and expressed in current value terms.

### Soil Remediation Alternatives

The present worth cost of Alternative 7 for soils is approximately \$1,649,000. The estimated cost range of the alternatives is from a present worth of \$66,000 (no action alternative) to \$43,970,000 (excavation and off-site incineration).

### Ground Water Alternatives

The 30-year present worth cost of Alternative 4 for ground water is approximately \$12,095,000. The estimated cost range of the alternatives is from a 30-year present worth of \$66,000 (no action alternative) to \$21,765,000 (PACT).

## 8. State Acceptance

The State of New York supports the selected remedy presented in this ROD. A copy of their concurrence letter is appended to this ROD.

## 9. Community Acceptance

The local community accepts the selected remedy. All comments that were received from the public during the public comment period are addressed in the attached Responsiveness Summary.

## **IX. THE SELECTED REMEDY**

Based upon consideration of the results of the RI/FS reports and after careful consideration of all reasonable alternatives, EPA recommends the following alternative for cleaning up the contaminated soils and ground water at the Pasley Solvents and Chemicals Superfund Site:

**Soil Remediation Alternative 7: Soil Vacuuming and Soil Flushing in conjunction with Ground Water Treatment Alternative 4: Extraction/Metals Precipitation/Air Stripping with Vapor Phase Granular Activated Carbon/GAC Polishing/Recharge.**

The soil remediation alternative, soil vacuuming, has been demonstrated to be effective primarily for removal of VOCs from the unsaturated zone. Circulation of air through the soil during the vacuuming process also would enhance the biodegradation of semi-volatiles in the

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unsaturated zone. If sampling after the conclusion of soil vacuuming demonstrates that concentrations of semi-volatile compounds are decreasing in the soil and are still not impacting ground water, the soil flushing portion (for the removal of semi-volatiles in soil) of Alternative 7 may be eliminated.

Specifically, the preferred alternatives will involve the following:

- 1) Treatment of approximately thirteen thousand (13,000) cubic yards of contaminated soil by soil vacuuming and/or by soil flushing, as necessary, until the recommended soil cleanup objectives are met or until no more VOCs can be effectively removed from the unsaturated (vadose) zone ;
- 2) Disposal of treatment residuals at a RCRA Subtitle C facility;
- 3) Remediation of the ground water by extraction/metals precipitation/air stripping with vapor phase granular activated carbon/GAC polishing/ and recharge to meet Federal and State drinking water MCLs, except in those cases where upgradient concentrations are above such standards;
- 4) Pumping of contaminated ground water from three extraction wells at a combined flow rate of approximately 450 gpm. The actual pumping rate will be determined during the Remedial Design;
- 5) Long-term monitoring to track the migration and concentrations of the contaminants of concern;
- 6) Implementation of a system monitoring program that includes the collection and monthly analysis of the influent and effluent from the treatment systems and periodic collection of well-head samples.
- 7) Evaluation of Site conditions at least once every five years to determine if a modification to the selected alternative is necessary; and
- 8) The option for EPA to invoke a technical waiver of the ground water ARARs if the remediation program indicates that reaching MCLs in the glacial aquifer is technically impracticable.

The selected ground water alternative also stipulates contingency measures, outlined under Ground Water Treatment Alternatives in the Description of Alternatives section of this ROD, whereby the groundwater extraction and treatment system's performance will be monitored on a regular basis and adjusted as warranted by the performance data collected during operation. If it is determined, in spite of any contingency measures that may be taken, that portions of the aquifer cannot be restored to its beneficial use, ARARs may be waived based on technical

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impracticability of achieving further contaminant reduction. The decision to invoke a contingency measure may be made during periodic review of the remedy, which will occur at intervals of no less often than every five years.

## **X. STATUTORY DETERMINATIONS**

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of the CERCLA establishes several other statutory requirements and preferences. These specify that, when complete, the selected remedial action for a site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The selected remedy also must be cost effective and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Finally, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

### **1. Protection of Human Health and the Environment**

The selected remedy for ground water is protective of human health and the environment. The selected ground water remedy eliminates all outstanding threats posed by the Site. The selected ground water remedy reduces contamination to health based levels except in those cases where upgradient concentrations exceed those levels. Contamination upgradient of the Site is suspected to be contributing to the ground water contamination at the Site. The Roosevelt Field Site, which is one of the major suspected sources of the contamination detected in the Pasley upgradient ground water monitoring well, was listed as a Class II site on the New York State Registry in July 1991. The EPA and NYSDEC will ensure that any sources contributing to contamination of the Site are addressed.

The selected remedy for soils is also fully protective of human health and the environment. The soil remedy removes a continuing threat to ground water posed by the on-site contaminated soils.

### **2. Compliance with Applicable or Relevant and Appropriate Requirements**

At the completion of response actions, the selected remedy will have complied with the following ARARs and considerations:

#### **Action-specific ARARs:**

Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (40 CFR 141.11-141.16) and 6 NYCRR Ground Water Quality Regulations (Parts 703.5, 703.6, 703.7) and the NYS Sanitary

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code (10 NYCRR part 5) provide standards for toxic compounds for public drinking water supply systems. The recharge process for treated ground water will meet underground injection well regulations under 40 C.F.R. 147. The extracted ground water will be treated to meet the above referenced drinking water standards prior to recharge.

Spent carbon from the ground water treatment system for removal of organics will be disposed of off-site, as well as any treatment residuals, consistent with applicable RCRA land disposal restrictions under 40 C.F.R. 268.

Chemical-specific ARARs:

Since the ground water at the Site is classified as IIb (GA by NYSDEC), drinking water standards are relevant and appropriate. Again, these include SWDA MCLs and 6NYCRR Ground Water Quality Regulations. However, achieving chemical-specific ARARs for ground water is dependent on remediation of upgradient sources. This is due to the fact that regardless of the Site cleanup, upgradient sources will continue to be a source of contamination to the ground water beneath the Site. EPA believes that the proposed remedial action will result in attainment of chemical specific ground water ARARs providing upgradient sources are remediated so that they no longer impact the Upper Glacial aquifer.

EPA may invoke a technical waiver of the chemical-specific ARARs if the remediation program indicates that reaching MCLs in the Upper Glacial aquifer is technically impracticable.

Until upgradient sources are remediated so that they no longer impact the Site, the remedial action will attain ground water cleanup levels equal to upgradient concentrations for certain contaminants.

**3. Cost Effectiveness**

The selected remedy is cost effective and provides the greatest overall protectiveness proportionate to costs. Soil vacuuming and soil flushing, at a present worth of \$1,649,000 is more cost effective than excavation with off-site disposal, at a present worth of \$8,675,000, and offers an equivalent degree of protectiveness. The \$12,095,000, 30-year present worth cost associated with the selected ground water treatment, is the most cost effective of all the alternatives. The \$12,095,000 cost associated with ground water treatment is cost effective in that the remedy provides the greatest overall protectiveness compared with the \$66,000 cost associated with no action, which is not considered to be protective.

**4. Utilization of Permanent Solutions and Alternative Treatment(or Resource Recovery) Technologies to the Maximum Extent Practicable**

The selected remedies represent the maximum extent to which permanent solutions and alternative treatment technologies can be utilized in a cost effective manner for the Site. This

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is evident by the selection of soil vacuuming, clearly an innovative technology. After treatment is complete, the soil will no longer be contributing contaminants to the underlying aquifer.

The ground water treatment used in the selected remedy will reduce the contaminants of concern to levels protective of human health prior to recharge. In addition, of those alternatives which are protective of human health and the environment and comply with ARARs, EPA has determined that the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. The modifying considerations of State and community acceptance also played a part in this determination.

The long-term effectiveness and permanence of the selected soil remedy is very high in that the surface soils would be treated and the contaminated areas restored. Ground water treatment also offers long-term effectiveness and permanence in that the remedial goal is to achieve ARARs except in those cases where upgradient concentrations prohibit such restoration.

Reduction of toxicity, mobility, or volume is also evident in the selected remedy. The treatment of on-site soil by soil vacuuming and/or soil flushing will effectively reduce the mobility of contaminants in surface soils. Ground water treatment has the goal of reducing contaminant concentrations in the aquifer to meet ARARs, effectively diminishing both toxicity and volume.

The short-term effectiveness and implementability of the selected soil remedy is high in that it would be conducted in-situ. The short-term effectiveness and implementability of the ground water treatment alternative is high in that there is no exposure to contaminated ground water during implementation and the remedy employs standard equipment and well developed technologies. As stated above, the cost associated with the selected remedy is the least costly of each alternative that is protective of human health and the environment and provides for treatment of the most hazardous substances.

##### **5. Preference for Treatment as a Principal Element**

By treating the VOC contaminated soils and ground water by means of in-situ soil vacuuming and/or soil flushing, and air stripping respectively, the selected remedy addresses the principal threat posed by the Site through the use of treatment technologies. Therefore, the statutory preference for remedies that employ treatment as a principal element is satisfied.

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## **XI. DOCUMENTATION OF SIGNIFICANT CHANGES**

The Proposed Plan for the Pasley Solvents and Chemicals Site was released to the public on February 14, 1992. The Proposed Plan identified soil remediation Alternative 7 and ground water remediation Alternative 4 as the preferred alternatives. EPA reviewed all comments submitted. Upon review of the comments, it was determined that no significant changes to the preferred remedy, as it was originally identified in the Proposed Plan, were necessary.

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**APPENDIX 1**

FAI 001 1473

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APPENDIX 2

PAI 001 1474

**APPENDIX 3**

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**APPENDIX 4**

PRI 001 1476

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**APPENDIX 5**

PAL 001 1477

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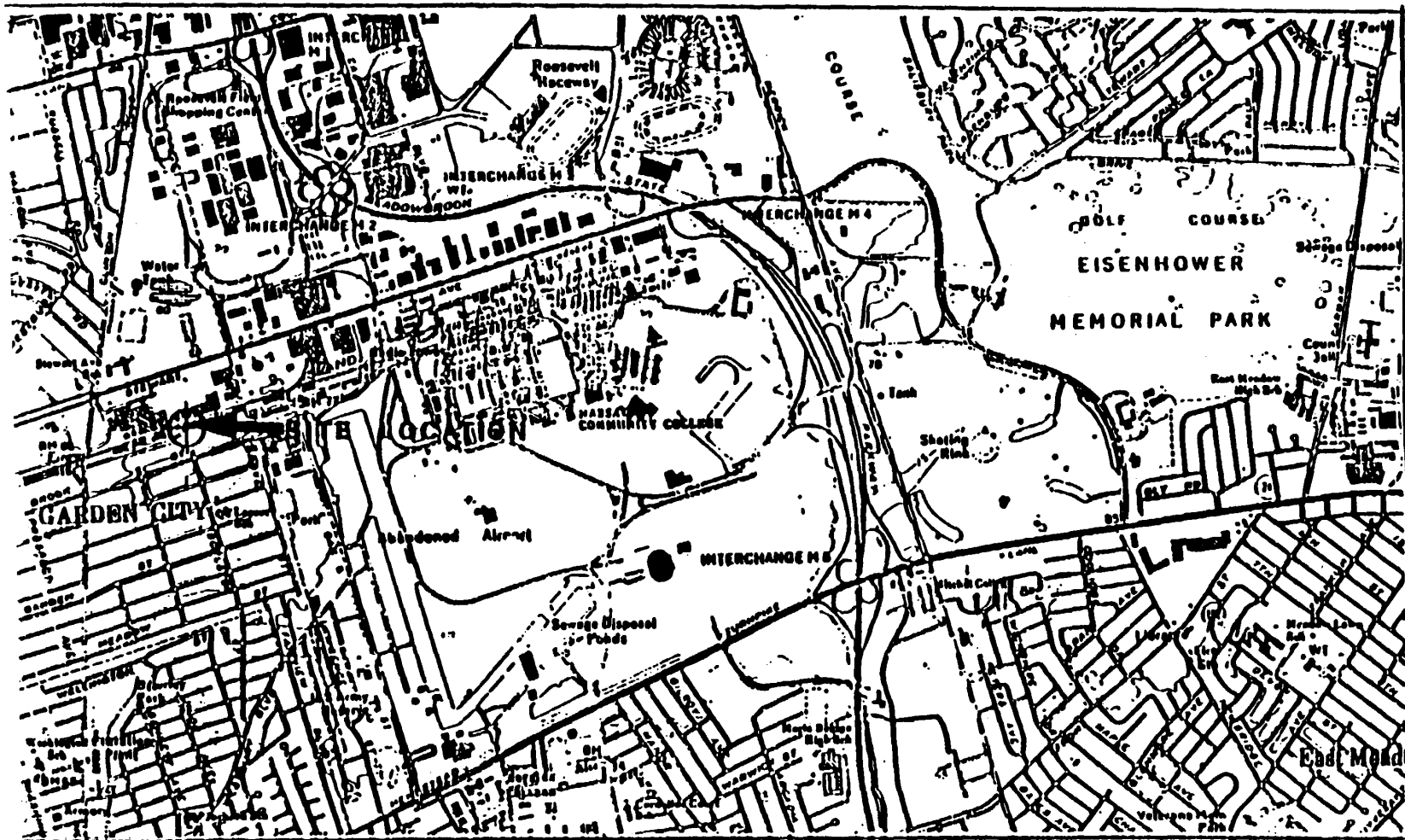
APPENDIX 1

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FIGURE 1

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PASLEY SOLVENTS AND CHEMICALS  
TOWN OF HEMPSTEAD, LONG ISLAND, N.Y.

**SITE LOCATION PLAN**

SCALE: 1" = 2000'

PROJECT NO: 4882

AUGUST 1988

**SOURCE:**

USGS QUADRANGLE : FREEPORT, N.Y.



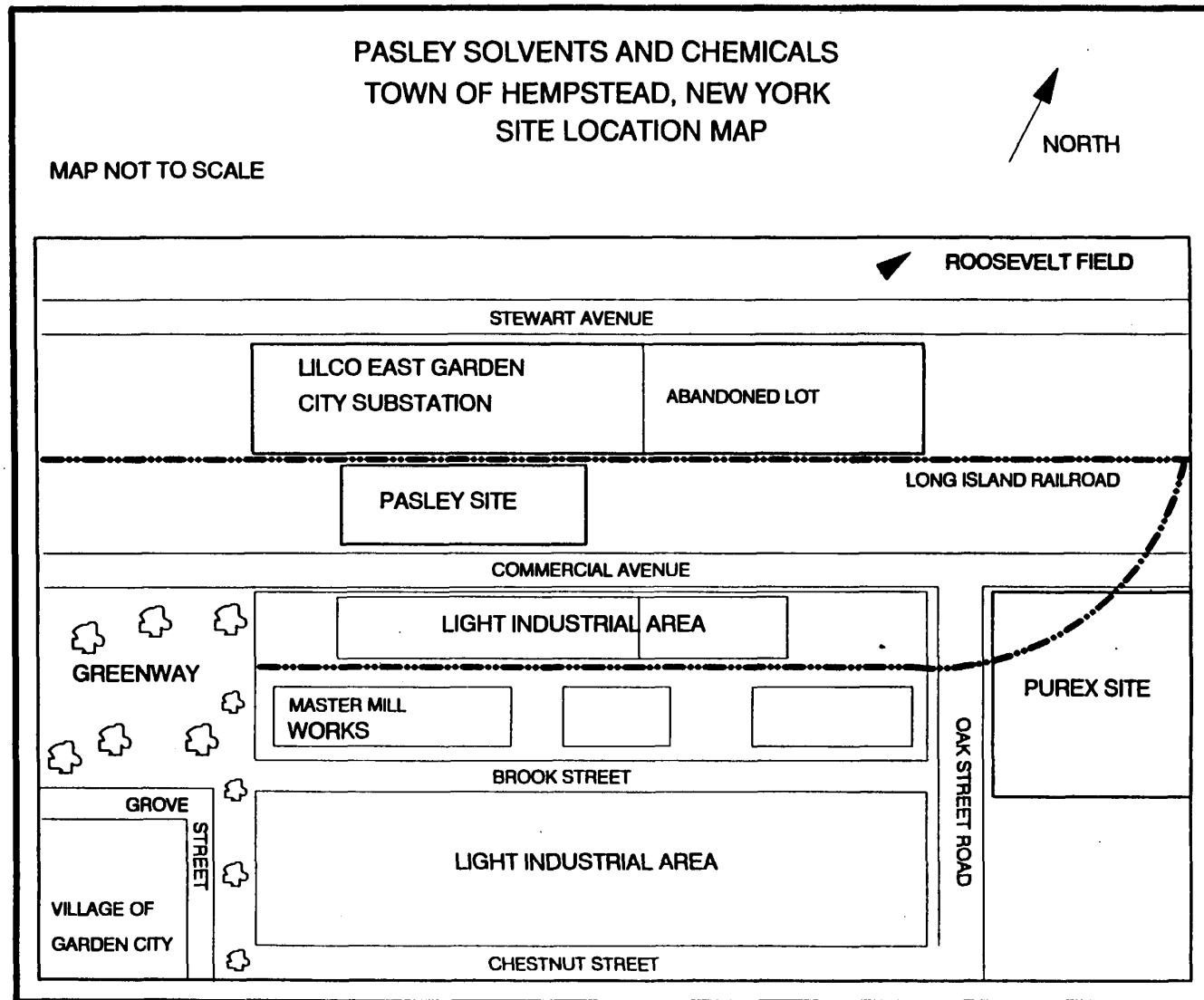
QUADRANGLE 1: 1479

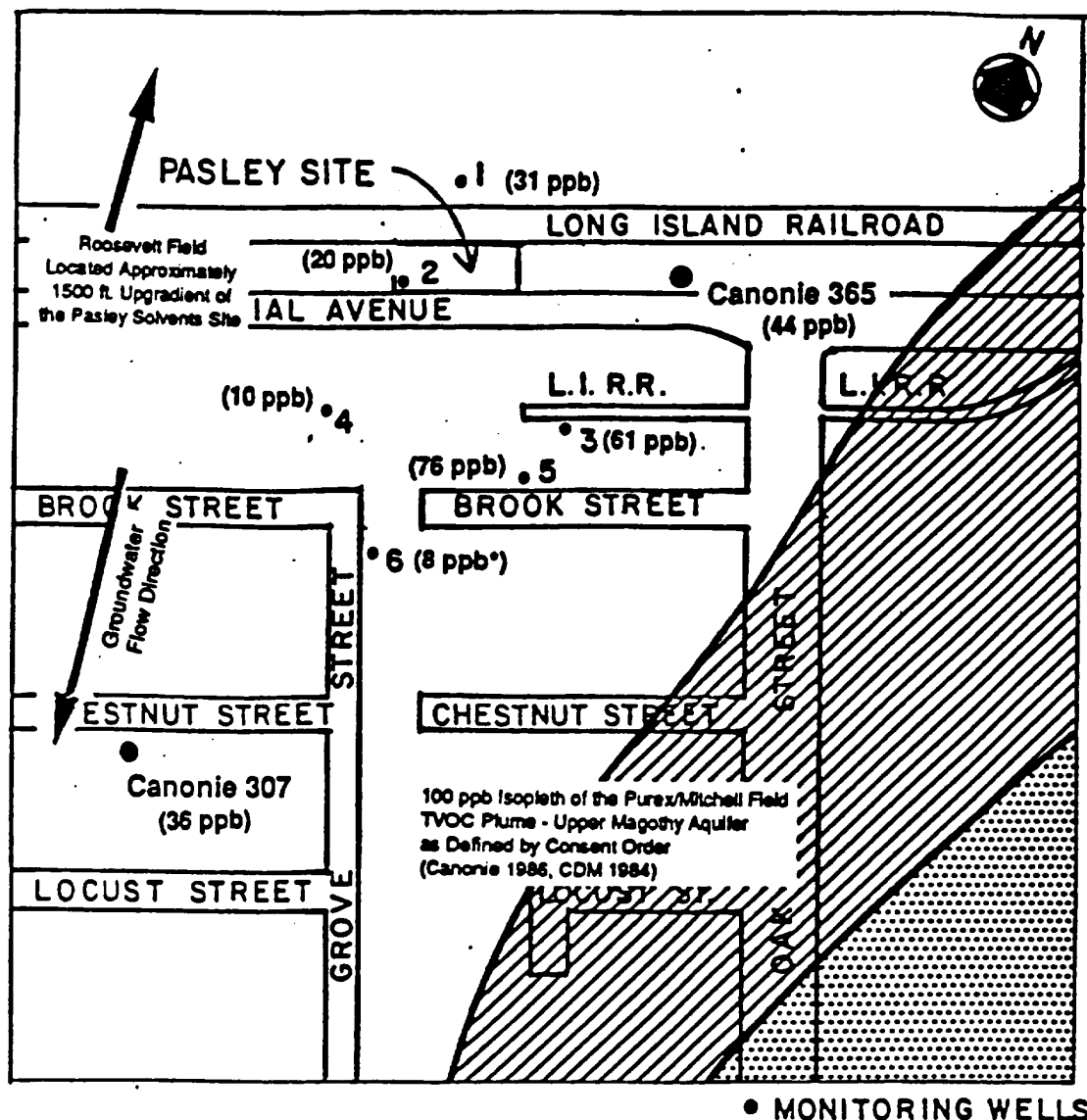
**M&E**

**Metcalf & Eddy**

FIGURE 2

PAI 001 1480





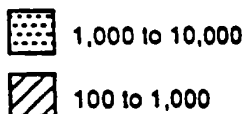
• MONITORING WELLS

\* 650 ppb of benzene was originally attributed to this well. Resampling indicated that benzene was not detected. The 8 ppb TVOC level shown here is the corrected TVOC value.



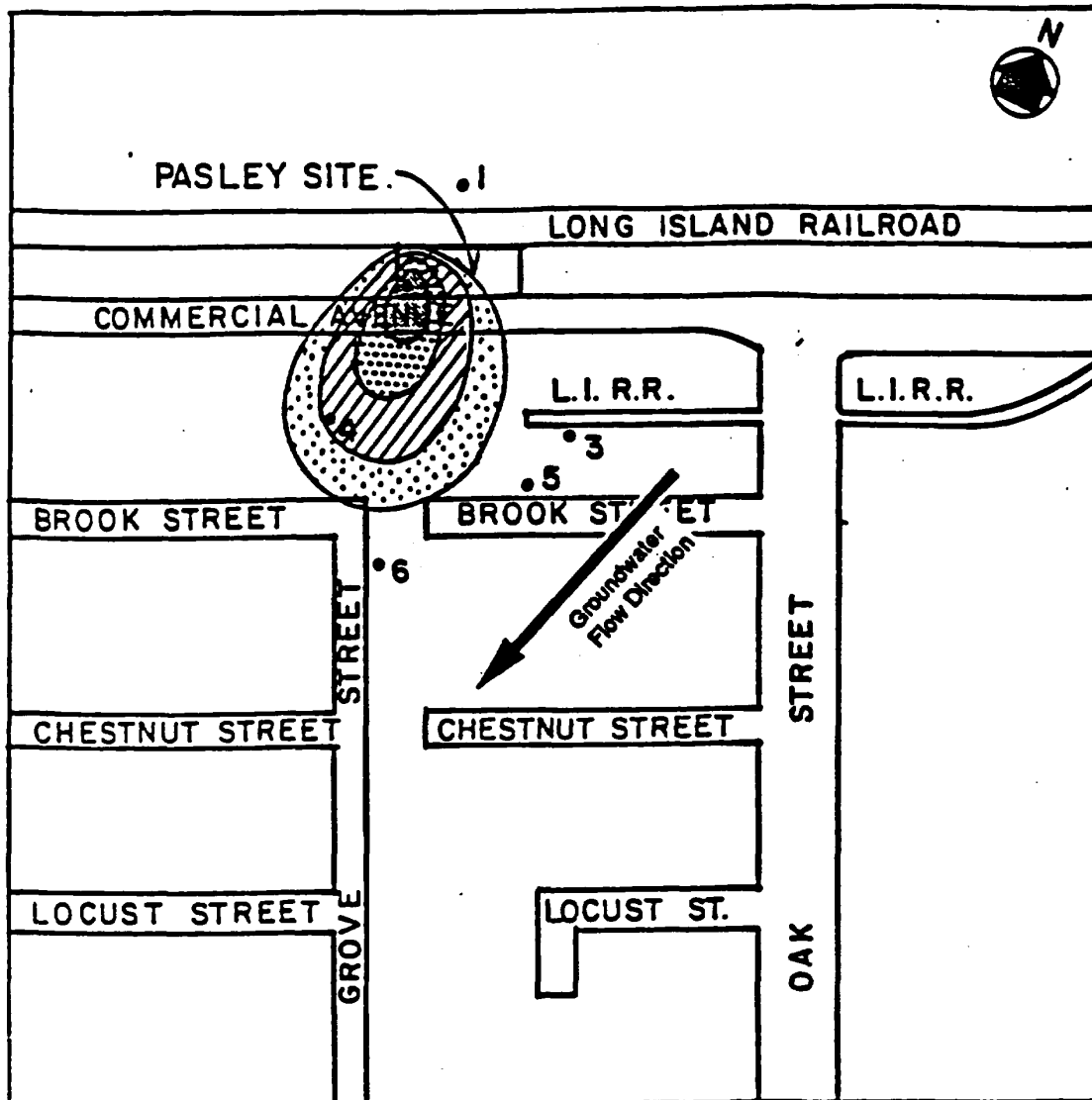
Scale in Feet

Contaminant Level (ppb)



**FS REPORT**  
**PASLEY SOLVENTS AND CHEMICALS**  
**Town of Hempstead, Long Island, NY**  
**TVOC CONTAMINATION - UPPER**  
**MAGOTHY AQUIFER**  
**Figure 3**

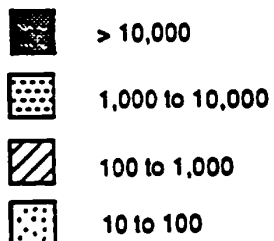
Prepared by: Metcalf & Eddy, Inc. Oct. 1991



**TVOIC:** Total Volatile Organic Index Compounds.  
TVOICs do not include all of the contaminant compounds found at the Pasley Solvents site (see discussion on pages 4-7 and 4-8 of this report)

● MONITORING WELLS  
300 150 0 300  
Scale in Feet

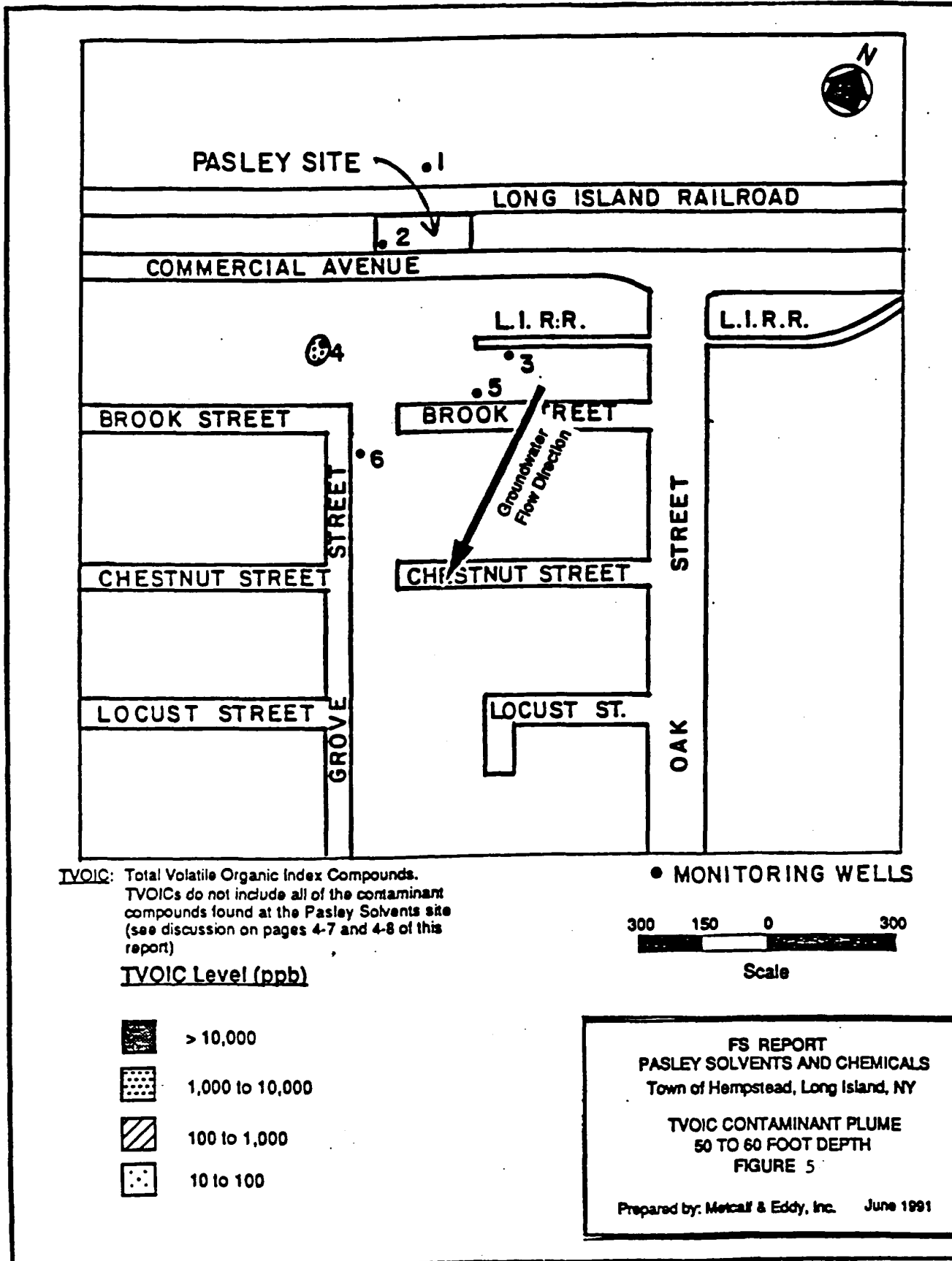
**TVOIC Level (ppb)**

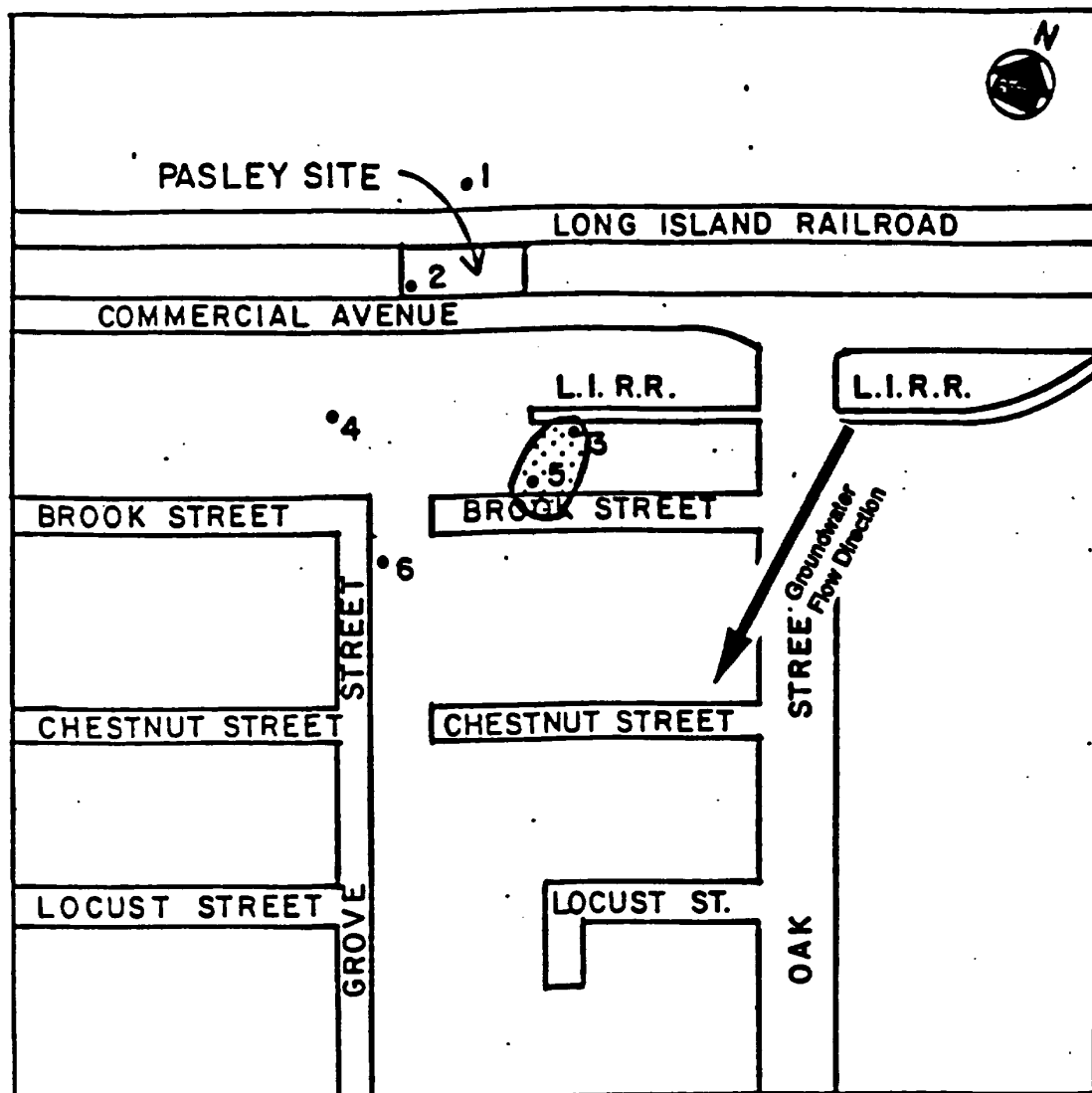


FS REPORT  
PASLEY SOLVENTS AND CHEMICALS  
Town of Hempstead, Long Island, NY

TVOIC CONTAMINANT PLUME  
20 TO 30 FOOT DEPTH  
FIGURE 4

Prepared by: Metcalf & Eddy, Inc. June 1991



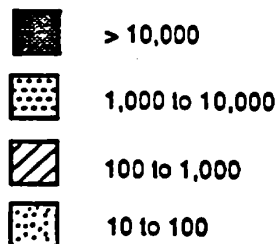


**TVOIC:** Total Volatile Organic Index Compounds.  
TVOICs do not include all of the contaminant compounds found at the Pasley Solvents site (see discussion on pages 4-7 and 4-8 of this report)

• MONITORING WELLS

300 150 0 300  
Scale in Feet

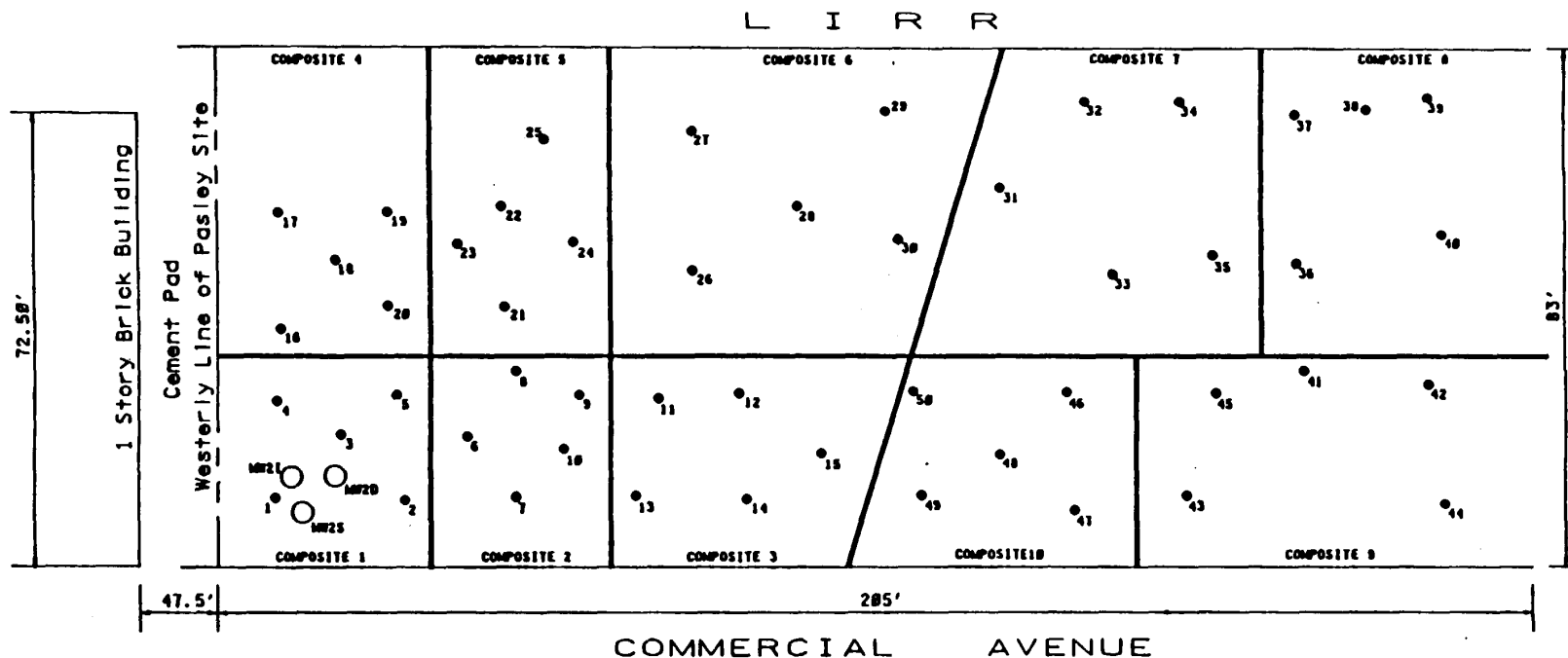
**TVOIC Level (ppb)**



**FS REPORT**  
**PASLEY SOLVENTS AND CHEMICALS**  
Town of Hempstead, Long Island, NY

**TVOIC CONTAMINANT PLUME**  
**80 TO 90 FOOT DEPTH**  
**FIGURE 6**

Prepared by: Metcalf & Eddy, Inc. June 1991



### Legend

- Surface Soil Samples
- Monitoring Well

0 25  
Scale in Feet

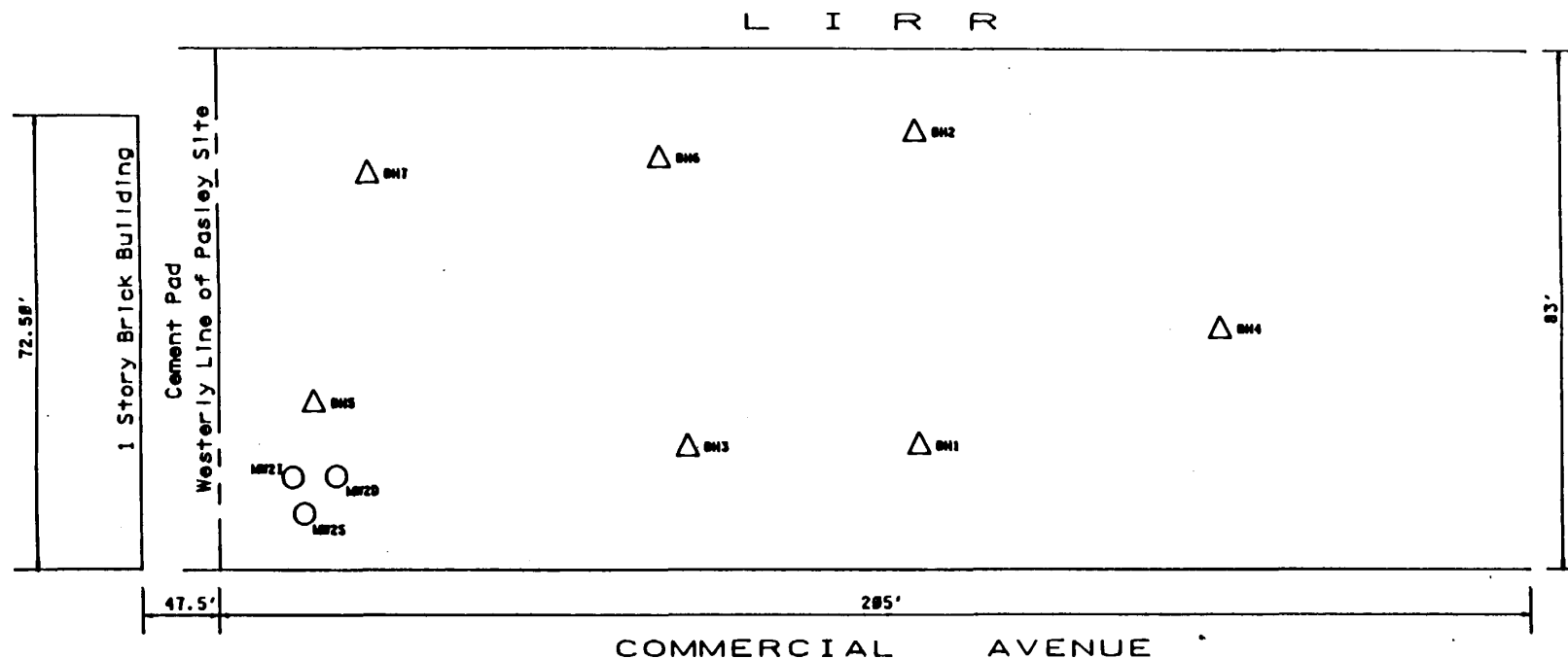


FINAL RI REPORT  
PASLEY SOLVENTS AND CHEMICALS  
Town of Hempstead, Long Island, NY

ON-SITE SURFACE SOIL  
SAMPLING LOCATIONS  
Figure 7

Prepared by: Metcalf & Eddy, Inc. June 1991





Legend

- △ Soil Boring
- Monitoring Well



0 25  
Scale in Feet

FINAL RI REPORT  
PASLEY SOLVENTS AND CHEMICALS  
Town of Hempstead, Long Island, NY

ON-SITE SUBSURFACE SOIL  
SAMPLING LOCATIONS

Figure 8

Prepared by: Metcalf & Eddy, Inc. June 1991

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APPENDIX 2

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PASLET SOLVENTS AND CHEMICALS SITE  
TABLE -1 FIRST ROUND GROUNDWATER SAMPLE RESULTS - MONITORING WELL

June 14, 1991  
Final RI Report

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SAMPLE NUMBERS	13	11	10	25	21	21-DUP	20	33	31	30	43	41	40	53	51	50	63	61	60
UNITS	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
MATRIX	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
SAMPLE DATE (1990)	3-1	3-1	3-1	2-22	2-23	2-23	2-23	2-28	2-28	2-28	2-26	2-26	2-26	3-2	3-1	2-28	2-27	2-27	2-27
SAMPLE LOCATION	----LILCO----			-----ON-SITE-----				-----LIRR-----			-----GREENWAY----			-----BROOK ST.----			-----GREENWAY----		
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Methylene Chloride	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	48J	130J	22J	1400J	1400J	580J	84J	510J	2200J	510J	400J	3800J	130J	17J	44J	44J	110J	260J	150J
Benzene	-	13	7	43J	10	11	3J	-	-	-	-	4J	-	-	-	-	-	-	650*
Chloroform	-	-	-	74J	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-
1,1-Dichloroethane	-	-	-	84J	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	-	-	-	630	-	-	1J	-	-	-	27	-	-	-	-	-	-	-	-
Trans 1,2-Dichloroethane	-	-	-	25000**E	3J	3J	6	-	-	11	140	15	-	-	-	13	-	-	-
2-Butanone	R	R	R	-	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Ethylbenzene	-	-	-	510	-	-	-	-	-	-	42	-	-	-	-	-	-	-	-
Tetrachloroethane	27	-	9	160J	1J	2J	4J	2	-	-	33	4J	5	-	-	-	-	-	2J
Toluene	-	-	-	1100	1J	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane	11	-	15	140J	1J	1J	8	-	-	50	250*J	15	10	-	2J	63	-	-	4J
1,1,1-Trichloroethane	32	-	-	3600	-	-	2J	240J*	-	-	390*	8	-	7	11	-	11	8	4J
Chlorobenzene	-	-	-	510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes (Total)	-	-	-	1100	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>																			
bis(2-Ethylhexyl) Phthalate	R	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	-
di-n-Butyl Phthalate	R	R	R	6J	-	R	2J	R	R	R	-	R	-	R	40	R	-	-	-
2-Methylnaphthalene	-	-	-	110	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-
Naphthalene	-	-	-	270	-	-	-	-	-	-	59	-	-	-	-	-	-	-	-
Benzoic Acid	-	-	-	R	R	-	-	-	-	-	R	-	-	-	-	-	-	-	-
Dibenzofuran	-	-	-	5J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	-	-	-	5J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
di-n-Octyl Phthalate	-	2J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.  
 J = Analyte present. Reported value may not be accurate or precise.  
 R = Unreliable Data Obtained. Data rejected by validator and is not usable.  
 \* = Five fold diluted sample. See Appendix E for minimum detection limit attained.  
 \*\* = Fifty fold diluted sample. Trans 1,2-Dichloroethane concentration above the calibration range in this sample. See Appendix E for minimum detection limit attained.  
 (-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.  
 J = Shallow well; I = Intermediate well; D = Deep well  
 DUP = Duplicate  
 R = Rejected Compound not Present in Sample  
 E = estimated concentration due to interference.  
 UJ = Quantitation Limit is estimated.

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PASLEY SOLVENTS AND CHEMICALS SITE  
TABLE 1 FIRST ROUND GROUNDWATER SAMPLE RESULTS - MONITORING WELL (Continued)

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SAMPLE NUMBERS	ER-1	ER-2	ER-3	ER-4	ER-5	ER-6	ER-7	TD-1	TD-2	TD-3	TD-4	TD-5	TD-6	TD-7	TD-8
UNITS	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
MATRIX	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
SAMPLE DATE (1990)	2-22	2-23	2-26	2-27	2-28	3-1	3-2	2-22	2-23	2-26	2-27	2-28	3-1	3-1	3-2
<b>VOLATILE ORGANIC COMPOUNDS</b>															
Chloromethane	3J	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	-	R	-	-	-	-	R	-	-	-	-	-	-	-	-
Acetone	-	110J	1200J	1800J	2300	8J	R	-	25J	R	R	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans 1,2-Dichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone	R	R	R	R	R	R	R	R	R	R	R	R	R	R	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethane	2J	2J	5	2J	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>															
bis(2-Ethylhexyl) Phthalate	R	-	-	-	-	R	-	-	-	-	-	-	-	-	-
di-n-Butyl Phthalate	-	-	61	-	R	R	R	-	-	-	-	-	-	-	-
2-Methylnaphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzoic Acid	R	R	R	-	-	-	-	-	-	-	-	-	-	-	-
di-n-Octyl Phthalate	-	-	2J	-	-	-	5J	-	-	-	-	-	-	-	-

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.  
J = Analyte present. Reported value may not be accurate or precise.  
R = Unreliable Result Obtained. Data rejected by validator and is not usable.  
(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory and field blanks.  
TB = Trip Blanks analyzed for volatile organics only  
EB = Equipment Blanks

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PASLEY SOLVENTS AND CHEMICALS SITE  
TABLE 1 FIRST ROUND GROUNDWATER SAMPLE RESULTS - MONITORING WELL (Continued)

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SAMPLE NUMBERS	1S	1I	1D	2S	2I	2I-DUP	2D	3S	3I	3D	EB-1	EB-2	EB-3	EB-4	EB-5	EB-6	EB-7
UNITS	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
MATRIX	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
SAMPLE DATE (1990)	3-1	3-1	3-1	2-22	2-23	2-23	2-23	2-28	2-28	2-28	2-22	2-23	2-26	2-27	2-28	3-1	3-2
SAMPLE LOCATION	LILCO			ON-SITE				LIRR									
METALS																	
Aluminum	42100J	4030J	155J	23400	1438	1388	416	15000	707	374	-	33.58	-	-	-	-	-
Antimony	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	111J	68.8J	25.4J	1128	51.18	49.28	25.68	90.28	74.08	33.08	5.08	18.18	-	18.58	20.88	19.6J	20.6J
Beryllium	1.7J	-	0.5	0.738	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	36000J	18100J	14600J	13900	23800	23400	18100	29900	18800	11400	40800	14900	-	15400	13200	13700J	15900J
Chromium	23.1J	43.8J	-	27.7J	13.5J	17.6J	13.1J	90.6J	12.4J	-	-	-	6.4J	-	6.68	9.6J	-
Cobalt	10.9J	-	-	16J	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	127J	279J	28.5J	99.4	10.38	8.78	40.5	136	32.0	15.28	1440	3800	4.28	7320	4300	7880J	275J
Cyanide	70	-	-	15	-	-	-	20	-	-	-	10	10	-	-	-	-
Iron	28900J	4690J	368J	99100J	2610J	2450J	1570J	13500J	21100J	2290J	171J	128J	78.78	155J	331J	25.7J	99.2J
Lead	R	R	R	15.3	9.1	7.3	8.7	22.4	9.7	4.5	-	-	-	-	-	R	R
Magnesium	8330J	5510J	2760J	32808	48208	4768	27508	46808	26208	38608	15308	5610	-	5810	-	6040J	7390J
Manganese	1060J	12200J	70.5J	1360	16100	15900	67.6	235	1760	221	-	8.9J	15.2	-	1.68	4.3J	1.8
Mercury	0.7	-	0.5	-	0.6	0.30	1.3	0.2	-	0.6	-	-	-	-	0.45	0.35	0.21
Nickel	53.8J	129J	18.2J	48.3	-	-	-	76.2	37.7J	-	-	-	-	-	-	-	-
Potassium	4270J	3110J	3290J	49608	18808	29308	6270	47108	19208	-	-	-	-	-	-	1650J	1800
Selenium	R	R	R	-	-	-	-	-	-	-	-	-	-	-	-	R	R
Silver	-	-	-	5.6J	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	4280J	35300J	28100J	390000J	36700J	34100J	26300J	18900J	33900J	24500J	9250J	12300J	-	8060	7820J	7900J	12500J
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	34.7J	-	5.9J	27.68	-	-	7.88	10.18	-	-	-	-	6.38	-	-	-	-
Zinc	1380	3200J	29.6J	859	67	51.2	417	1630	272	138	31.9	59.1	3.88	100	39.0	98.9J	29.1J

NOTE: Full Target Compound List metals are listed in this table.  
J = Analyte present. Reported value may not be accurate or precise.  
R = Unreliable Result Obtained. Data rejected by validator and is not usable.  
(-) = Indicates compound was analyzed for but not detected.  
S = Shallow Well  
I = Intermediate Well  
D = Deep Well  
EB = Equipment Blank  
DUP = Duplicate  
B = Trace levels (less than contract-required detection limit: See Appendix F)

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PASLEY SOLVENTS AND CHEMICALS SITE  
TABLE 1... FIRST ROUND GROUNDWATER SAMPLE RESULTS - MONITORING WELL (Continued)

June 14, 1991  
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SAMPLE NUMBERS	43	41	40	53	51	50	63	61	60
UNITS	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
MATRIX	Water	Water	Water	Water	Water	Water	Water	Water	Water
SAMPLE DATE (1990)	2-26	2-26	2-26	3-2	3-1	2-28	2-27	2-27	2-27
SAMPLE LOCATION	-----GREENWAY-----			---BROOK STREET---			-----GREENWAY-----		
<b>METALS</b>									
Aluminum	97400	861	216	26400J	2390J	433	24000	734	747
Antimony	39.9JB	-	-	-	-	-	-	-	-
Arsenic	-	-	-	-	-	-	-	-	-
Barium	372	38.6B	24.9B	94.3J	74.0J	30.1B	119B	70.6B	66.5B
Beryllium	6.6	-	-	1.6J	-	-	2.1JB	-	1JB
Cadmium	-	-	-	-	-	-	-	4.5JB	-
Calcium	22300	19500	10700	16600J	24900J	13300	24900	27900	17700
Chromium	63.6J	-	-	32.0J	255J	-	25.8J	22.0J	16.5J
Copper	194	40.8	41.5	76.6J	252J	85.2	71.2	30.2	64.1
Cobalt	45.1JB	-	-	13.7J	19.8J	-	-	-	-
Cyanide	10	-	10	-	-	-	-	10	-
Iron	152000J	3410J	903J	28300J	5050J	3180J	27600J	3180J	4880J
Lead	34.6	9.5	8.2	R	R	5.8	17.8	11.8	11.1
Magnesium	7730	3160B	2770	4140J	4250J	3820B	4080B	5050	3160B
Manganese	4220	5630	149	659J	3380J	236	103	6610	1630
Mercury	-	-	-	-	-	-	0.3	-	-
Nickel	100	207	32.1JB	32.7J	310J	-	31.4JB	33.5JB	33.5JB
Potassium	10200	2620B	2200B	5160J	6900J	-	2500B	9550	3020B
Selenium	-	-	-	R	R	-	-	-	-
Silver	-	-	-	-	-	-	-	-	-
Sodium	17000J	28700J	30400J	6060J	37000J	25200J	13500J	30600J	33700J
Thallium	-	-	-	5.7J	-	-	-	-	-
Vanadium	94.8	-	-	40.9J	-	-	38.2B	-	-
Zinc	1070	192	607	159J	2940	193	341	254	659

NOTE: Full target Compound List metals are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in field and trip blanks.

S = Shallow Well

I = Intermediate Well

D = Deep Well

B = Trace levels (less than contract required detection limit: See Appendix F)

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PANLEY SOLVENTS AND CHEMICALS SITE  
TABLE 2 SECOND ROUND GROUNDWATER SAMPLE RESULTS

June 18, 1991  
Final RI Report

SAMPLE NUMBERS	2S <sup>a</sup>	21	21-DUP	20	13	11	10	43 <sup>b</sup>	41	40	EB-1	EB-2	TB-1	TB-2
UNITS	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
MATRIX	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
SAMPLE DATE (1990)	4-19	4-18	4-18	4-18	4-19	4-19	4-18	4-18	4-18	4-18	4-18	4-19	4-18	4-19
LOCATION	ON-SITE	ON-SITE	ON-SITE	ON-SITE	LILCO	LILCO	LILCO	GREENWAY	GREENWAY	GREENWAY				
<b>VOLATILE ORGANICS</b>														
Chloroethane	-	-	-	-	-	-	-	-	-	-	77	-	-	-
Methylene Chloride	16J	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	-	-	-	-	-	200J	25J	400 <sup>c</sup> J	-	-	-	37J	-	-
1,1-Dichloroethane	62	-	-	-	-	-	-	-	-	3J	-	-	-	-
1,1-Dichloroethane	300	-	-	-	-	-	-	20	-	-	-	-	-	-
Trans-1,2-Dichloroethane	37000 <sup>de</sup>	-	-	3J	2J	-	3J	65	-	-	-	-	-	-
Chloroform	33	-	-	-	-	-	-	25	-	-	-	-	-	-
2 Butanone	R	R	R	R	R	R	R	R	R	R	R	R	R	R
1,1,1-Trichloroethane	2800 <sup>de</sup>	-	-	-	15	-	-	180J <sup>e</sup>	-	-	-	-	-	-
Trichloroethane	320	-	-	11	12	-	12	150	-	12	-	-	-	-
Benzene	20J	13	14	4J	3J	38	6	-	13	-	-	-	-	-
Tetrachloroethane	91	-	-	5	24	-	8	29	2J	7	-	-	-	-
Toluene	750	-	2J	-	-	-	-	-	2J	-	-	-	-	-
Ethylbenzene	340	-	-	-	-	-	-	18	-	-	-	-	-	-
Xylenes (Total)	2100 <sup>de</sup>	11	12	-	-	-	-	24	-	-	-	-	-	-

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validators and is not usable.

<sup>a</sup> = Five fold diluted sample. See Appendix E for minimum detection limit attained.

<sup>de</sup> = 250 fold dilution. See Appendix E for minimum detection limit attained.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level report in laboratory and field blanks.

S = Shallow Well

I = Intermediate Well

D = Deep Well

EB = Equipment Blank

TB = Trip Blank

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TABLE 2 PASLEY SOLVENTS AND CHEMICALS SITE  
SECOND ROUND GROUNDWATER SAMPLE RESULTS (Continued)

June 14, 1991  
Final RI Report

SAMPLE NUMBERS	23	21	21-DUP	20	13	11	10	43	41	40	EB-1	EB-2
UNITS	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
MATRIX	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
SAMPLE DATE (1990)	4-19	4-18	4-18	4-18	4-19	4-19	4-19	4-18	4-18	4-14	4-18	4-19
LOCATION	-----ON-SITE-----			-----LILCO-----			-----GREENWAY-----					
<b>SEMI-VOLATILE ORGANICS</b>												
Naphthalene	100	-	-	-	-	-	-	23	-	-	-	-
2-Methylnaphthalene	97	36	26J	-	-	-	-	9J	-	-	-	-
Acenaphthylene	-	21	16J	-	-	-	-	-	-	-	-	-
Acenaphthene	1J	7J	6J	-	-	-	-	-	-	-	-	-
Dibenzofuran	-	2J	-	-	-	-	-	-	-	-	-	-
Fluorene	3J	6J	7J	-	-	-	-	-	-	-	-	-
Phenanthrene	-	3J	2J	-	-	-	-	-	-	-	-	-
Anthracene	-	-	-	-	-	-	-	-	-	-	-	-
di-n-Butyl Phthalate	-	R	R	R	-	-	-	R	R	R	-	R
Fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl) Phthalate	-	-	-	-	-	-	-	-	-	-	-	R

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory and field blanks.

S = Shallow Well

I = Intermediate Well

D = Deep Well

DUP = Duplicate

EB = Equipment Blank

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PASLEY SOLVENTS AND CHEMICALS SITE  
TABLE 3 MAY 1991 GROUNDWATER SAMPLE RESULTS - DEEP MONITORING WELL

OCTOBER 1991  
FINAL RI REPORT

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SAMPLE NUMBERS	MW-1D	MW-2D	MW-3D	MW-4D	MW-5D	MW-6D	TB-1	TB-2	EB-1	EB-2	MW-7D*
UNITS	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
MATRIX	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
SAMPLE DATE	5/8/91	5/9/91	5/8/91	5/8/91	5/9/91	5/8/91	5/8/91	5/9/91	5/8/91	5/9/91	5/9/91
SAMPLE LOCATION	LILCO	On-Site	LIRR	Greenway	Brook St.	Greenway	---	---	---	---	DUP

VOLATILE ORGANIC COMPOUNDS

Benzene	-	-	-	-	-	-	-	-	-	-	0.9J
Bromochloromethane	R	-	-	R	-	-	R	R	R	R	-
Bromoform	R	R	R	R	R	R	R	R	R	R	-
Chloromethane	-	-	-	-	-	-	0.1	0.2	0.2	-	-
1,2-Dibromo-3-chloropropane	R	R	R	R	R	R	R	R	R	R	R
Dichlorodifluoromethane	-	-	-	-	-	7.6	-	-	-	-	-
1,1-Dichloroethane	1.2J	5.1UJ	1.0UJ	1.9J	-	1.0UJ	-	1.0UJ	1.0UJ	1.0UJ	4.9
1,1-Dichloroethene	1.8	6.6UJ	-	2.9	-	-	-	-	-	-	4.3
Trans&Cis 1,2-Dichloroethene	2.2	87.8UJ	44.0	3.4	40.9	1.1	-	-	-	-	76.4J
Methylene Chloride	-	-	-	-	-	-	1.4J	2.5J	2.6J	2.2J	-
Tetrachloroethene	7.2	7.6UJ	2.0	8.5	2.1	3.8	-	-	-	-	6.6
1,1,1-Trichloroethane	2.0	7.2UJ	-	2.9	-	5.4	-	-	-	-	6.7J
Trichloroethene	10.6	15UJ	99	16.3	91.0	9.1	-	-	-	-	14.5
trans-1,3 Dichloropropylene	R	R	R	R	R	R	R	R	R	R	R
Carbon Disulfide	-	-	-	-	-	-	9.1J	-	-	-	-

Note: Only those compounds that are detected either as estimated, rejected, or positive values in one or more samples are listed in this table.

UJ = Qualified Estimate

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

(-) = Indicates compounds was analyzed for but not detected at a level significantly above the level reported in laboratory and field blanks.

TB = Trip Blanks analyzed for volatile organics only

EB = Equipment Blanks (Field Blanks)

\* = Sample MW-7D is a duplicate sample from well MW-2D

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PASLEY SOLVENTS AND CHEMICALS SITE  
TABLE 4. ON-SITE SURFACE SOIL SAMPLE RESULTS

June 14, 1991  
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SAMPLE NUMBERS(Composites)	1-5	1-5DUP	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE DATE (1989)	9-13	9-13	9-13	9-13	9-13	9-13	9-14	9-14	9-14	9-14	9-14
SAMPLE DEPTH (in.)	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12
<b>SEMI-VOLATILE ORGANICS</b>											
1,2-Dichlorobenzene	-	-	-	-	-	-	2800J	1000J	-	890J	-
Naphthalene	610J	-	3400J	-	1000J	-	1300J	380J	43000	-	-
2-Methylenaphthalene	1100J	-	10000	-	4600J	1100J	4000J	-	9800J	460J	2000J
Fluorene	470J	-	-	-	-	-	-	-	-	-	-
Phenanthrene	5700J	500J	1600J	1400J	2300J	1900J	900J	-	620J	370J	-
Anthracene	2600J	-	-	-	-	530J	-	-	-	-	-
di-n-Butyl Phthalate	2500J	2000J	-	370J	68000	1700J	290J	430J	150000	4800J	-
Fluoranthene	11000	700J	360J	400J	1100J	1900J	370J	-	-	-	-
Pyrene	8400J	760J	680J	570J	4200J	1600J	620J	-	670J	-	600J
Benzo(a) Anthracene	5000	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl) Phthalate	-	R	-	-	-	R	R	-	R	120000***	R
Chrysene	6000J	790J	-	280J	2900J	1100J	380J	-	-	-	-
Benzo(k) Fluoranthene	4400J	730J	-	-	1100J	990J	330J	-	-	-	-
Benzo(k) Fluoranthene	1800J	-	-	-	-	450J	-	-	-	-	-
Benzo(a) Pyrene	3300J	370J	-	-	1600J	750J	-	-	-	-	-
Indeno (1,2,3-cd) Pyrene	1600J	-	-	-	-	-	-	-	-	-	-
Dibenz (a,h) Anthracene	-	-	-	-	-	-	-	-	-	-	-
Benzo (g,h,i) Perylene	1500J	-	-	-	840J	-	-	-	-	-	-

NOTE: Only those compounds that are detected as either estimated, rejected or positive in one or more samples are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator, and is not usable.

\* = Medium level analysis with 20 fold dilution. See Appendix E for minimum detection limits attained.

\*\* = Medium level analysis with 15 fold dilution. See Appendix E for minimum detection limits attained.

\*\*\* = Medium level analysis with 30 fold dilution. See Appendix E for minimum detection limits attained.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.

DUP = Duplicate

1-5 = Composite of samples 1-5

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PASLEY SOLVENTS AND CHEMICALS SITE  
TABLE 4: SURFACE SOIL SAMPLE RESULTS (Continued)

June 14, 1991  
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SAMPLE NUMBERS (Composites)	1-5	1-5MIP	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	EN-01
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/l
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Water
SAMPLE DATE (1989)	9-13	9-13	9-13	9-13	9-13	9-13	9-14	9-14	9-14	9-14	9-14	9-13
SAMPLE DEPTH (in.)	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	
<b>METALS</b>												
Aluminum	6330	5530	5030	3920	9630	7450	7650	7970	4260	7620	2670	-
Antimony	-	-	-	48J	16.7J	-	-	-	-	-	-	-
Arsenic	11.5J	9.9J	16.7J	14.2J	4.3J	R	9.2J	17.1J	R	7.4J	2.00	-
Barium	94.6	86.7	79.2	49.5B	425	144	116	86.9	113	159	29.5B	-
Beryllium	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	44200J	33300J	18000J	19000J	44300J	39800J	30800J	22700	5530J	18900J	14600J	217B
Chromium	58.8	42.8	28.7	18.1	47.7	52.8	58.1	42.9	34.1	45.6	9.9	-
Cobalt	4.5B	4.3B	4.9B	2.9B	6.5B	7.6B	5.5B	6.9B	3.8B	6.9B	-	-
Copper	51.2J	40.4J	40J	46.1J	72.3J	59.5J	53.5J	44.6J	74.8J	67.5J	15.9J	-
Cyanide	-	-	-	-	0.28J	0.45J	-	-	4.4J	0.34J	0.39J	-
Iron	23200	22800	17600	20700	41800	30700	23500	23100	20300	39900	11100	143
Lead	335J	308J	194J	577J	1230J	758J	416J	228J	457J	709J	134J	-
Magnesium	22800	16400	8700	9430	22100	19300	15000	10900	2820	7460	7690	-
Manganese	145	128	77	118	212	177	123	107	99.2	265	73.6	-
Mercury	0.14J	0.19J	-	0.14J	-	-	-	-	-	-	-	-
Nickel	16.3	12.9	15.7	-	14.2	17.0	15.6	25.1	18.0B	17	7.7B	-
Potassium	712B	412B	511B	684B	509B	701B	574B	975B	360B	560B	352B	-
Selenium	-	-	-	R	-	-	-	-	-	-	-	-
Silver	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	146B	154B	139B	86.8B	129B	95.0B	165B	210B	108B	117B	49.3B	106B
Thallium	1.9J	2.5J	3.1	R	3.3	2.5B	2.0B	-	-	-	-	-
Vanadium	27.8	26.9	24.6	17.1	32.3	28.7	25.8	37.7	24.6	28.6	10.1B	-
Zinc	215	202	131	179	455	308	242	133	555	658	712	20.3

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

(-) = Indicates compound was analysed for but not detected at a level significantly above the level reported in laboratory or field blanks.

DUP = Duplicates

EB = Equipment Blank; TB = Trip Blank

B = Trace level (less than contract required detection limit; See Appendix F)

UJ = Estimated detection limit

1-5 = Composite of samples 1-5.

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TABLE 4 PASLEY SOLVENTS AND CHEMICALS SITE  
ON-SITE SURFACE SOIL SAMPLE RESULTS (Continued)

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SAMPLE NUMBERS	1AB	1AR-DUP	2AB	3AB	4AR	5AB	6AR	7AB	8AB	9AR	10AB	11AB
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE DATE (1989)	9-13	9-13	9-13	9-13	9-13	9-13	9-13	9-13	9-13	9-13	9-13	9-13
SAMPLE DEPTH (in.)	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12
<b>VOLATILE ORGANICS</b>												
Vinyl Chloride	-	130J	89J	77	-	250	68	-	R	-	210J	-
Chloroethane	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	100J	110J	32J	-	12J	13J	-	-	-	R	740J	-
Acetone	46J	-	-	-	-	150	-	-	86J	-	-	-
1,1-Dichloroethane	90J	200J	52J	19J	30	49	28	-	160J	30	36J	-
Trans-1,2-Dichloroethane	600J	930J	7400J	950	240	230	160	530J	240J	230	4400J	-
Chloroform	-	-	-	-	10J	-	-	-	-	-	-	-
2-Butanone	82J	R	-	R	-	-	-	R	R	-	-	R
1,1,1-Trichloroethane	-	17J	-	-	-	-	-	-	11J	-	-	-
Trichloroethane	52J	97J	240J	57	49	12J	31	240J	32J	22J	230J	-
Tetrachloroethane	27J	110J	140J	130	81	41	-	220J	54J	71	100J	32
Toluene	-	-	-	14J	48	12J	-	10J	-	-	38J	-
Chlorobenzene	-	-	-	-	-	-	-	-	11J	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-
Xylene	-	-	-	65J	-	-	-	-	19J	44	16J	16J

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.  
J = Analyte present. Reported value may not be accurate or precise.  
R = Unreliable Result Obtained. Data rejected by validator and is not usable.  
- = Medium level analysis with ten fold dilution. See Appendix E for minimum detection limits attained.  
(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.  
DUP = Duplicates

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PASLEY SOLVENTS AND CHEMICALS SITE  
TABLE - 4 ON-SITE SURFACE SOIL SAMPLE RESULTS (Continued)

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SAMPLE NUMBERS	12AB	13AB	14AB	15AB	16AB	17AB	18AB	19AB	20AB	21AB	22AB	23AB
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE DATE (1989)	9-13	9-13	9-13	9-13	9-13	9-13	9-13	9-13	9-13	9-13	9-13	9-13
SAMPLE DEPTH (In.)	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12
<b>VOLATILE ORGANICS</b>												
Vinyl Chloride	670J	-	-	-	460J	-	-	-	-	-	-	-
Chloroethane	-	-	-	-	79J	-	-	-	-	-	-	-
Methylene Chloride	190J	15J	R	R	R	R	R	R	50J	59J	-	R
Acetone	720J	-	45J	52	14000 <sup>a</sup>	-	500	81	950J	290J	38J	-
1,1-Dichloroethane	-	-	-	-	-	-	-	-	-	-	-	46J
1,1-Dichloroethane	580J	9J	-	-	270J	69	23J	79	120J	270J	-	73J
Trans-1,2-Dichloroethane	24000J	84	-	-	700J	28	160	R	R	25000J	R	R
Chloroform	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone	-	R	-	R	110J	R	59	-	-	-	-	-
1,1,1-Trichloroethane	870J	-	-	-	-	6900	-	-	260J	470J	-	R
Trans-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane	3500 <sup>a</sup>	-	13J	28	190J	150	12J	27J	24000 <sup>a</sup>	19000 <sup>a</sup>	3700 <sup>a</sup>	R
Benzene	-	-	-	-	-	-	-	-	-	6J	-	-
Tetrachloroethane	370J	-	21J	-	49J	R	19J	42	7600 <sup>a</sup>	84000 <sup>a</sup>	87000 <sup>a</sup>	90000 <sup>a</sup>
Toluene	540J	-	-	8J	12000 <sup>a</sup> J	-	54000 <sup>a</sup>	750	780J	210J	910J	R
Chlorobenzene	-	-	-	-	-	-	-	-	-	-	-	48J
Ethylbenzene	34J	-	-	-	35J	-	72	-	25J	13J	380J	120J
Xylene (Total)	17000 <sup>a</sup>	-	-	-	260J	-	290	-	45J	15J	R	240J

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

<sup>a</sup> = Medium level analysis with ten fold dilution. See Appendix E for minimum detection limit attained.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.

UJ = Quantitation limit is estimated.

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PASLEY SOLVENTS AND CHEMICALS SITE  
TABLE 4. ON-SITE SURFACE SOIL SAMPLE RESULTS (Continued)

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SAMPLE NUMBERS	24AB	25AB	26AB	27AB	28AB	29AB	30AB	31AB	32AB	33AB	34AB	35AB
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE DATE (1989)	9-13	9-13	9-14	9-14	9-14	9-14	9-14	9-14	9-14	9-14	9-14	9-14
SAMPLE DEPTH (In.)	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12
<b>VOLATILE ORGANICS</b>												
Vinyl Chloride	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	72J	-	R	-	-	-	150J	24J	35J	60	40J	170J
Acetone	-	-	-	-	-	-	670J	-	-	-	-	62J
1,1-Dichloroethane	39J	-	50	-	-	-	570J	110J	-	-	-	120J
Trans-1, 2-Dichloroethane	R	3400*	910	42	23J	17J	82000*	16000*	-	31	30J	R
Chloroform	-	-	-	-	-	14J	-	350J	11J	41	860J	-
2-Butanone	R	R	53J	-	-	49J	-	-	R	69J	R	-
1,1,1-Trichloroethane	140J	-	180	-	-	-	R	420J	12J	-	-	59J
Trans-1, 3-Dichloropropene	-	-	-	20	14J	250	-	-	-	-	-	-
Trichloroethene	5900*	3300*	86	-	-	-	700J	120000*	130J	71	790J	600J
Benzene	-	-	-	-	-	-	87J	16J	-	-	-	-
Tetrachloroethene	73000	48000*	140	86	22J	150	21000*	120000*	110	57	420J	34000*
Toluene	27J	170J	27	-	-	36	470000*	900J	-	-	200J	170J
Chlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	140J	-	-	-	-	710	15J	-	-	-	300J
Xylene (Total)	-	5500*	100	-	-	-	27000*	63J	-	-	-	21000*

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

\* = Medium level analysis with ten fold dilution. See Appendix E for minimum detection limit attained.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.

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PASLEY SOLVENTS AND CHEMICALS SITE  
TABLE 4 ON-SITE SURFACE SOIL SAMPLE RESULTS (Continued)

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SAMPLE NUMBERS	36AB	37AB	38AB	39AB	40AB	41AB	42AB	43AB	44AB	45AB	46AB	47AB
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE DATE (1989)	9-14	9-14	9-14	9-14	9-14	9-14	9-14	9-14	9-14	9-14	9-14	9-14
SAMPLE DEPTH (In.)	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12	6-12
<b>VOLATILE ORGANICS</b>												
Vinyl Chloride	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	55J	17J	-	-	-	45J	110J	R	-	330J	140J	-
Acetone	37J	-	-	-	-	-	30J	-	-	-	590J	-
1,1-Dichloroethane	40J	6J	-	-	-	-	72J	-	-	40J	27J	-
Trans-1, 2-Dichloroethane	49J	240J	> 15J	-	-	140J	12000*J	-	-	460J	100J	-
Chloroform	12J	-	28J	-	58J	60J	690J	-	-	410J	17000*	8J
2-Butanone	51	R	590J	-	R	R	84J	53J	R	R	460J	57J
1,1,1-Trichloroethane	160J	360J	-	14J	35J	-	300J	-	-	41J	-	-
Trans-1, 3-Dichloroethane	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethane	570J	2600*	400J	88J	470J	910J	120000*	72	4J	28000J	67J	-
Benzene	-	-	-	-	-	-	-	-	-	-	61J	-
Tetrachloroethane	14000*	55000*	R	640J	270000*	230000*	70000*	92	10	650J	25J	-
Toluene	4600*	R	-	-	34J	R	6700*	-	-	27J	97J	-
Chlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	3000*	2700*	-	-	-	-	620	-	-	-	-	-
Xylene (Total)	1100*	35000*	-	-	-	73J	20000*	-	-	10J	-	-

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.  
J = Analyte present. Reported value may not be accurate or precise.  
R = Unreliable Result Obtained. Data rejected by validator and is not usable.  
\* = Medium level analysis with ten fold dilution. See Appendix E for minimum detection limit attained.  
(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.  
UJ = Quantitation limit is estimated.

PASLEY SOLVENTS AND CHEMICALS SITE  
TABLE 4 ON-SITE SURFACE SOIL SAMPLE RESULTS (Continued)

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SAMPLE NUMBERS UNITS	48AB ug/kg	49AB ug/kg	50AB ug/kg	TB-1 ug/l	BLK-1 ug/l
MATRIX					
SAMPLE DATE (1989)	9-14	9-14	9-14	9-14	9-14
SAMPLE DEPTH (in.)	6-12	6-12	6-12	--	--
<b>VOLATILE ORGANICS</b>					
Vinyl Chloride	-	-	370J	-	-
Chloroethane	-	-	-	-	-
Methylene Chloride	-	-	140J	-	-
Acetone	-	-	750J	-	-
1,1-Dichloroethane	-	-	160J	-	-
Trans-1, 2-Dichloroethane	-	-	20000*	-	-
Chloroform	-	-	-	-	-
2-Butanone	52J	39J	320J	R	R
1,1,1-Trichloroethane	-	-	52J	-	-
Trichloroethene	-	-	120J	-	-
Tetrachloroethene	50	-	130J	-	-
Toluene	-	-	330J	-	-
Ethylbenzene	-	-	-	-	-
Xylene (Total)	-	-	220J	-	-

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

\* = Medium level analysis with ten fold dilution. See Appendix E for minimum detection limit attained.

(-) = Indicates compound was analysed for but not detected at a level significantly above the level reported in laboratory or field blanks.

TB = Trip Blank

BLK-1 = Equipment Blank

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PASLEY SOLVENTS AND CHEMICALS SITE  
TABLE 5. ON-SITE SOIL BORING SAMPLE RESULTS

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SAMPLE NUMBERS	BH-1A	BH-1B	BH-2A	BH-2B	BH-3A	BH-3B	3A-DUP	3B-DUP	BH-4A	BH-4B	BH-5A	BH-5B	BH-6A	BH-6B
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE DATE (1989)	9-19	9-19	9-20	9-20	9-22	9-22	9-22	9-21	9-20	9-21	9-21	9-21	9-25	9-25
SAMPLE DEPTH (Ft.)	12-14	24-26	12-14	24-26	12-14	24-26	12-14	24-26	12-14	24-26	12-14	22-24	12-14	22-24
<b>SEMI-VOLATILE ORGANICS</b>														
Naphthalene	43J	450	5500	2900	1200J	290J	1700	-	-	-	-	-	-	-
2-Methylnaphthalene	88J	2500	5500	3000	13000	2400	15000	-	-	-	-	-	790	-
Acenaphthene	-	-	-	-	760J	-	-	-	-	-	-	-	-	-
Dibenzofuran	-	-	-	-	-	220J	1100J	-	-	-	-	-	-	-
Fluorene	-	-	280J	160J	-	340J	1400J	-	-	-	-	-	190J	-
Phenanthrene	-	340J	390J	220J	2500	880	2300	-	-	69J	-	-	260J	-
Anthracene	-	-	-	-	-	86J	240J	-	-	-	-	-	-	-
di-n-Butyl Phthalate	310J	270J	390J	490	150J	130J	120J	77J	680	120J	120J	76J	140J	120J
Fluoranthene	-	33J	100J	59J	200J	32J	230J	-	-	-	-	-	-	-
Pyrene	100J	87J	190J	100J	240J	42J	280J	-	-	-	-	-	21J	-
bis(2-Ethylhexyl) Phthalate	R	R	R	4900	-	-	-	R	R	R	R	R	-	-
Chrysene	-	-	160J	55J	-	-	-	-	-	-	-	-	-	-
di-n-Octyl Phthalate	87J	170J	-	43J	-	-	-	-	-	-	-	-	-	-

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.

BH = Borehole

DUP = Duplicate

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TABLE 5 PASLEY SOLVENTS AND CHEMICALS SITE  
ON-SITE SOIL BORING SAMPLE RESULTS (Continued)

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SAMPLE NUMBER	BH-7A	BH-7B	BH-8A	BH-8B	BH-EB-1	BH-EB-2	BH-EB-3	BH-EB-4	BH-EB-5	BH-EB-6
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
MATRIX	Soil	Soil	Soil	Soil	Soil	Water	Water	Water	Water	Water
SAMPLE DATE (1989)	9-25	9-25	10-23	10-23	9-19	9-20	9-21	9-22	9-25	10-23
SAMPLE DEPTH (Ft.)	12-14	22-24	12-14	22-24						
<b>SEMI-VOLATILE ORGANICS</b>										
Naphthalene	650	880J	-	3600	-	-	-	-	-	-
2-Methylnaphthalene	2600	9100	7500	4800	-	-	-	-	-	-
Acenaphthene	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	280J	550J	480J	-	-	-	-	-	-	-
Diethyl Phthalate	-	-	-	-	-	-	-	9J	-	-
Fluorene	420	820J	-	-	-	-	-	-	-	-
Phenanthrene	910	1000J	560J	490	-	-	-	-	-	-
Anthracene	170J	-	-	-	-	-	-	-	-	-
Di-n-Butyl Phthalate	130J	210J	120J	42J	110	130	820	650	7J	1J
Fluoranthene	71J	-	47J	42J	-	-	-	-	-	-
Pyrene	270J	150J	59J	39J	-	-	-	-	-	-
bis (2-Ethylhexyl) Phthalate	-	-	410J	1000	-	R	-	-	-	-
Chrysene	120J	-	-	19J	-	-	-	-	-	-
di-n-octyl Phthalate	-	-	-	110J	-	-	-	-	-	-

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.

BH = Borehole

EB = Equipment Blank

B = Trace level (less than contract required detection limit: See Appendix F)

TABLE 5 PASLEY SOLVENTS AND CHEMICALS SITE  
ON-SITE SOIL BORING SAMPLE RESULTS (Continued)

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page J

SAMPLE NUMBER	BH-1A	BH-1B	BH-2A	BH-2B	BH-3A	BH-3B	3A-DUP	3B-DUP	BH-4A	BH-4B	BH-5A	BH-5B	BH-6A	BH-6B	BH-7A	BH-7B
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE DATE (1989)	9-19	9-19	9-20	9-20	9-22	9-22	9-22	9-21	9-20	9-21	9-21	9-21	9-25	9-25	9-25	9-25
SAMPLE DEPTH (Ft.)	12-14	24-26	12-14	24-26	12-14	24-26	12-14	24-26	12-14	24-26	12-14	22-24	12-14	22-24	12-14	22-24
<b>VOLATILE ORGANICS</b>																
Methylene Chloride	-	1200J	790J	-	710J	-	-	-	-	-	-	-	17J	-	-	360J
Acetone	130J	-	-	110J	-	11J	-	34J	19J	-	-	24J	18J	-	-	-
1,1-Dichloroethane	12J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1, 2-Dichloroethane	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	9J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
1,1,1-Trichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	320J
Trichloroethane	100J	-	-	-	-	160J	-	-	-	-	-	-	-	-	-	2800
4 Methyl - 2-pentanone	-	-	-	-	-	-	-	-	-	-	-	-	-	3600	-	-
Tetrachloroethane	21J	-	12000	-	480J	55J	680J	-	21J	-	-	-	-	9700	520	21000
Toluene	-	200	1200	-	4400J	460J	6900J	-	7J	-	-	-	-	230J	21J	590J
Ethylbenzene	-	-	500J	-	1600J	510J	2200J	-	-	-	-	-	-	540J	23J	330J
Total Xylene	-	390	1000	-	6000J	R	8300J	-	-	12J	-	-	-	2000	71	750
1,1,2-Trichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.

BH = Borehole

DUP = Duplicate

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PASEY SOLVENTS AND CHEMICALS SITE  
 TABLE 5 . ON-SITE SOIL BORING SAMPLE RESULTS (Continued)

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SAMPLE NUMBERS	BH-8A	BH-8B	BH-EB1	BH-EB2	BH-EB3	BH-EB4	BH-EB5	BH-EB6	BH-TB1	BH-TB2	BH-TB3
UNITS	ug/kg	ug/kg	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
MATRIX	Soil	Soil	Water	Water	Water	Water	Water	Water	Water	Water	Water
SAMPLE DATE (1989)	10-23	10-23	9-19	9-20	9-21	9-22	9-25	10-23	9-19	9-20	9-21
SAMPLE DEPTH (Ft.)	12-14	22-24									
<b>VOLATILE ORGANICS</b>											
Methylene Chloride	-	-	2J	-	-	-	-	-	-	-	-
Acetone	-	27J	6J	-	-	-	-	-	-	-	-
2-Butanone	R	R	R	R	24J	20J	-	-	-	-	-
1,1,1-Trichloroethane	-	70	-	-	R	R	R	R	R	R	R
Trichloroethene	-	300	-	-	-	-	-	-	-	-	-
4 Methyl - 2-pentanone	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	110	180	-	-	-	-	-	-	-	-	-
Toluene	24J	310	-	-	-	-	-	-	-	-	-
Ethylbenzene	75	330	-	-	-	-	-	-	-	-	-
Total Xylene	210	1200	-	-	-	-	-	-	-	-	-
Total 1,2-Dichloroethane	-	98	-	-	-	-	-	-	-	-	-

NOTE: Only those compounds that are detected either as estimated, rejected or positive value in one or more sample are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.

EB = Equipment Blank

TB = Trip Blank analyzed for volatile organics only

TABLE 5 PASLEY SOLVENTS AND CHEMICALS SITE  
ON-SITE SOIL BORING SAMPLE RESULTS (Continued)

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page 1.

SAMPLE NUMBER	BH-1A	BH-1B	BH-2A	BH-2B	BH-3A	BH-3B	3B-DUP	3A-DUP	BH-4A	BH-4B	BH-5A	BH-5B	BH-6A	BH-6B
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE DATE (1989)	9-19	9-19	9-20	9-20	9-22	9-22	9-22	9-22	9-20	9-21	9-21	9-21	9-25	9-25
SAMPLE DEPTH (Ft.)	12-14	24-26	12-14	24-26	12-14	24-26	24-26	12-14	12-14	24-26	12-14	22-24	12-14	22-24
<b>METALS</b>														
Aluminum	13300	2010	14600	8130	3150	1130	1700	3220	5820	1890	4210	2640	4710	1280
Antimony	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	30.8B	-	29.7B	19.3B	-	-	-	-	-	-	-	1.8B	-	-
Beryllium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	6.1B	-	5.2B	3.3B	3.4B	-	-	3.2B	8.7B	-	-	-	4.4B	-
Calcium	1440B	964B	944B	837B	R	R	R	R	859B	R	R	R	803B	784B
Chromium	R	R	29.6	R	5.8	3.4	5	4.5	R	R	3.7	20.1	7.5	2.2J
Copper	31.2	16	25.7	13.6	23.2	20.7	33.9	19.6	16.3	24.0	20.5	27.2	12.3	10.7
Cyanide	-	-	-	-	-	-	-	3.1	-	-	-	-	-	-
Iron	-	R	R	R	4520	2090	2170	4660	-	2670	9100	11300	4110	1970
Lead	59J	-	-	12.6J	-	6.9J	6.4J	-	12.2J	13.7J	13.4J	7.5J	R	17.3J
Magnesium	1800	418B	840B	595B	406B	291B	304B	409B	512B	273B	293B	323B	367B	242B
Manganese	R	R	R	R	26.9	11.4	7.6	30.4	R	7.9	190	23.3	22.7	8.7
Mercury	0.19	-	-	0.4B	-	-	1.1	-	-	0.94	-	-	-	0.2B
Nickel	12.1J	-	9.8J	-	6.0J	6.3J	-	6.1J	7.1J	6.5J	-	-	5.8J	-
Potassium	444B	153B	695B	130B	145B	-	245B	191B	-	-	-	207B	-	-
Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	-	-	-	-	-	-	-	-	-	3.3J	-	-	-	3.2J
Sodium	75.6B	62B	101B	78B	118B	143B	152B	132B	91.9B	111B	95.7B	148B	R	R
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	24.6	4.3B	24.4	12.4B	6.0B	3.5B	4.6B	5.1B	7.7B	3.5B	3.8B	17.2	6.6B	-
Zinc	71.8J	R	83.9J	61.7J	31J	38.1J	58.1J	31.5J	R	49.7J	48.3J	39.6J	39.8J	R

NOTE: Full target Compound list metals are listed in this table.

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.

B = Trace level (less than contract required detection limit; See Appendix F)

DUP = Duplicate

BH = Borehole

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TABLE 5 PASLEY SOLVENTS AND CHEMICALS SITE  
ON-SITE SOIL BORING SAMPLING DATA (Continued)

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SAMPLE NUMBER	BH-7A	BH-7B	BH-8A	BH-8B	EB-1	EB-2	EB-3	EB-4	EB-5	EB-6
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
MATRIX	Soil	Soil	Soil	Soil	Water	Water	Water	Water	Water	Water
SAMPLE DATE (1989)	9-25	9-25	10-23	10-23	9-19	9-20	9-21	9-22	9-25	10-23
SAMPLE DEPTH (Ft.)	12-14	22-24	12-14	22-24						
<b>METALS</b>										
Aluminum	13700	1610	10800	2200J	-	-	-	-	-	-
Antimony	-	-	-	-	-	-	-	-	-	-
Arsenic	1.7B	-	-	-	-	-	-	-	-	-
Barium	34.3B	-	27B	-	-	-	-	-	-	-
Beryllium	-	-	-	-	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-	-	-	-	-
Cobalt	4.5B	-	4.5B	-	-	-	-	-	-	-
Calcium	875B	865B	1180B	138B	-	101B	151B	92.4B	312B	-
Chromium	12.8	-	16.4J	5.1J	13.0	7.7B	-	-	6.2J	6.8J
Copper	25.8	14.2	29.4	16.9	-	-	-	-	-	-
Cyanide	-	-	-	-	-	10.6	-	-	-	-
Iron	14000	2120	11400J	3470J	12500	24100	62.9B	279	216	-
Lead	-	R	22.2J	-	6.2	6.4	-	8.0	11.8	-
Magnesium	511B	264B	477B	192B	-	-	-	-	138B	52.8B
Manganese	46.7	9.2	37.9	32.9	83.7	205	-	-	-	-
Mercury	-	0.27	0.43J	-	-	-	-	-	-	-
Nickel	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	417B	500B	-	-	-	-	-	1230B
Selenium	-	-	-	-	-	-	-	-	-	-
Silver	-	-	-	5.3	-	-	-	-	-	-
Sodium	R	R	55.0B	34.7B	-	55.6B	61.6B	116B	186B	80.1B
Thallium	-	-	-	-	-	-	-	-	-	-
Vanadium	18.2	-	17.2B	5.8J	-	-	-	-	-	-
Zinc	202J	-	43.6J	49.5J	-	23.2	20.1	26.8	-	-

NOTE: Full Target Compound list metals are listed in this table

J = Analyte present. Reported value may not be accurate or precise.

R = Unreliable Result Obtained. Data rejected by validator and is not usable.

(-) = Indicates compound was analyzed for but not detected at a level significantly above the level reported in laboratory or field blanks.

B = Trace level (less than contract required detection limit: See Appendix F)

BH = Borehole

EB = Equipment Blank

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TABLE 6 · ON SITE SOIL SAMPLE DATA - TOTAL VOCs GREATER THAN 1 PPM

PASLEY SOLVENTS AND CHEMICALS SITE  
HEMPSTEAD, NEW YORK

SURFACE SOIL SAMPLE LOCATION	TOTAL VOC CONCENTRATION (PPB)	PRIMARY CONTAMINANTS (*)	BORING LOCATION	DEPTH FT	TOTAL VOC CONCENTRATION (PPB)	PRIMARY CONTAMINANTS (*)
1	1564	trans-1,2-dichloroethene				
2	7953	trans-1,2-dichloroethene				
3	1312	trans-1,2-dichloroethene				
7	1000	trans-1,2-dichloroethene trichloroethene tetrachloroethene				
10	5770	trans-1,2-dichloroethene	3	12	19300	ethylbenzene, xylene
				22	1200	toluene, ethylbenzene
12	47691	trans-1,2-dichloroethene xylene				
16	28153	toluene acetone				
17	7147	1,1,1-trichloroethane	7	22	26000	tetrachloroethene
18	55100	toluene				
19	980	toluene				
20	33830	trichloroethene ethylbenzene				
21	129000	tetrachloroethene				
22	92000	tetrachloroethene				
23	90481	tetrachloroethene	1	22	1800	methylene chloride, xylene
24	79180	tetrachloroethene	6	22	16000	tetrachloroethene 4-methyl-2-pentanone
25	60500	tetrachloroethene				
28	1550	trans-1,2-dichloroethene				
30	603000	toluene	2	12	15500	tetrachloroethene
31	258000	trichloroethene tetrachloroethene				
34	2300	trichloroethene tetrachloroethene chloroform				
35	56500	tetrachloroethene xylene				
36	23700	tetrachloroethene				
37	98000	tetrachloroethene xylene				
40	270000	tetrachloroethene				
41	231228	tetrachloroethene				
45	30000	trichloroethene				
46	18600	chloroform				
50	22800	trans-1,2-dichloroethene				

\* Each primary contaminant accounts for at least 20% of the total VOC concentration

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TABLE 7  
SUMMARY OF CHEMICALS OF POTENTIAL CONCERN FOR THE  
PASLEY SOLVENTS AND CHEMICALS SITE

Chemical	On Site Surface Soil	On Site Subsurface Soil	Upper Glacial Aquifer	Upper Magoghy Aquifer
<b>Organic Chemicals:</b>				
Acenaphthene	-	X	-	-
Anthracene	-	X	-	-
Benzene	-	-	X	-
Chloroform	X	X	X	-
Chrysene	-	X	-	-
Dibenzofuran	-	X	-	-
1,1-Dichloroethane	-	X	-	X
1,2-Dichloroethane (total)	-	X	-	-
1,1-Dichloroethene	X	-	X	X
trans-1,2-Dichloroethene	X	X	X	X
Di-n-butylphthalate	-	-	-	-
Di-n-octylphthalate	-	X	-	-
Ethylbenzene	-	X	X	-
bis(2-Ethylhexyl)phthalate	X	X	-	-
Fluoranthene	-	X	-	-
Fluorene	-	X	-	-
4-Methyl-2-pentanone	-	X	-	-
Methylene chloride	-	X	-	-
2-Methylnaphthalene	X	X	X	-
Naphthalene	X	X	X	-
Phenanthrene	-	X	-	-
Pyrene	-	X	-	-
Tetrachloroethene	X	X	X	-
Toluene	X	X	X	-
1,1,1-Trichloroethane	-	X	X	X
Trichloroethene	X	X	X	-
Vinyl chloride	X	-	-	-
Xylenes (total)	X	X	X	-
<b>Inorganic Chemicals:</b>				
Aluminum	-	X	-	X
Antimony	X	X	-	-
Arsenic	X	X	-	-
Barium	X	X	-	-
Beryllium	-	X	X	X
Cadmium	-	X	-	-
Chromium	X	-	X	-
Cobalt	-	X	-	X
Cyanide	-	-	-	X
Lead	X	-	X	X
Manganese	-	-	-	X
Nickel	-	-	-	X
Silver	-	X	-	-
Thallium	X	-	-	-
Vanadium	X	X	-	X
Zinc	X	-	-	X

- = Not selected as a chemical of potential concern.  
X = Selected as a chemical of potential concern.

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**TABLE 8**  
**SUMMARY OF CHEMICALS DETECTED IN ON-SITE SURFACE SOIL SAMPLES**  
**PASLEY SOLVENTS AND CHEMICALS (a)**

(Concentrations reported in mg/kg)

Chemical	Frequency of Detection (b)	Range of Detected Concentrations
<b>Organic Chemicals:</b>		
Acetone	18 / 50	0.026 - 14
Anthracene	2 / 10	0.53 - 1.4
Benzene	4 / 36	0.006 - 0.087
Benzo(a)anthracene	1 / 10	2.6
Benzo(b)fluoranthene	4 / 10	0.33 - 2.6
Benzo(k)fluoranthene	2 / 10	0.45 - 0.98
Benzo(g,h,i)perylene	2 / 10	0.83 - 0.84
Benzo(a)pyrene	3 / 10	0.75 - 1.8
2-Butanone	13 / 34	0.039 - 0.46
Chlorobenzene	2 / 47	0.011 - 0.048
Chloroethane	1 / 50	0.079
Chloroform	14 / 50	0.008 - 17
Chrysene	5 / 10	0.28 - 3.4
Di-n-butylphthalate	8 / 10	0.29 - 150
1,2-Dichlorobenzene	3 / 10	0.89 - 2.8
1,1-Dichloroethane	29 / 50	0.006 - 0.58
1,1-Dichloroethene	1 / 12	0.046
trans-1,2-Dichloroethene	33 / 44	0.015 - 82
trans-1,3-Dichloropropene	3 / 36	0.005
Ethylbenzene	14 / 50	0.013 - 3
bis(2-Ethylhexyl)phthalate	2 / 6	6.8 - 120
Fluoranthene	6 / 10	0.36 - 5.9
Indeno(1,2,3-c,d)pyrene	1 / 10	0.88
Methylene Chloride	22 / 40	0.012 - 0.74
2-Methylnaphthalene	8 / 10	0.46 - 10
Naphthalene	6 / 10	0.38 - 43
Phenanthrene	8 / 10	0.37 - 3.1
Pyrene	8 / 10	0.57 - 4.6
Tetrachloroethene	43 / 48	0.01 - 270
Toluene	26 / 47	0.008 - 470
1,1,1-Trichloroethane	17 / 48	0.0098 - 6.9
Trichloroethene	41 / 49	0.004 - 120
Vinyl Chloride	9 / 49	0.068 - 0.67
Xylenes	21 / 49	0.01 - 35
<b>Inorganic Chemicals:</b>		
Aluminum	10 / 10	2,670 - 9,630
Antimony	2 / 10	16.7 - 48
Arsenic	8 / 8	2.8 - 17.1
Barium	10 / 10	29.5 - 430
Calcium	10 / 10	5,530 - 44,300
Chromium	10 / 10	9.9 - 58.1
Cobalt	9 / 10	2.9 - 7.6
Copper	10 / 10	15.9 - 74.8
Cyanide	4 / 10	0.3 - 4.4
Iron	10 / 10	11,100 - 41,800
Lead	10 / 10	130 - 1,230
Magnesium	10 / 10	2,820 - 22,100
Manganese	10 / 10	73.6 - 270
Mercury	1 / 10	0.1
Nickel	9 / 10	7.7 - 25.1
Potassium	10 / 10	350 - 980
Thallium	5 / 9	2 - 3.3
Vanadium	10 / 10	10.1 - 37.7
Zinc	10 / 10	130 - 710

(a) Samples 1-10 (composite samples) and 1AB-50AB.

(b) The number of samples in which the chemical was detected divided by the total number of samples analyzed for that chemical.

\* = Selected as chemical of potential concern.

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TABLE 8 (continued)

SUMMARY OF CHEMICALS DETECTED IN UPPER GLACIAL AQUIFER GROUNDWATER  
PASLEY SOLVENTS AND CHEMICALS (a)

(Concentrations reported in ug/L)

Chemical	Range of Detected Concentrations		
	Upgradient (b)	On Site (c)	Downgradient (d)
<b>Organic Chemicals:</b>			
* Benzene	2.75 - 25.5	12 - 31.5	8.5
Acenaphthene	ND	1 - 6.5	ND
Acenaphthylene	ND	10 - 18.5	ND
Chlorobenzene	ND	250	ND
* Chloroform	ND	53.5	25
Dibenzofuran	ND	2 - 5	ND
1,1-Dichloroethane	ND	465	23.5
* 1,1-Dichloroethene	ND	73	ND
* trans-1,2-Dichloroethene	2.25	2.75 - 31,000	8 - 102.5
* Ethylbenzene	ND	425	30
Fluorene	ND	3 - 6.5	ND
* 2-Methylnaphthalene	ND	36 - 103.5	12.5
* Naphthalene	ND	225	41
di-n-Octylphthalate	2	ND	ND
Phenanthrene	ND	2.5 - 5	ND
* Tetrachloroethene	25.5	1.5 - 125.5	3 - 31
* Toluene	ND	1.5 - 1,100	2
* 1,1,1-Trichloroethane	ND	3,200	3.25 - 285
* Trichloroethene	11.5	1 - 230	15 - 205
* Xylenes	ND	11.5 - 1,600	34.5
<b>Inorganic Chemicals:</b>			
Aluminum	4,030 - 42,100	141 - 23,400	861 - 97,400
Barium	68.8 - 111	50.2 - 112	38.6 - 372
* Beryllium	1.7	0.73	6.6
Calcium	18,100 - 36,000	13,900 - 23,600	19,500 - 22,300
* Chromium	23.1 - 43.8	15.6 - 27.7	63.6 - 258
Cobalt	10.9	16	40.8 - 194
Cyanide	70	15	ND
Iron	4,690 - 28,900	2,530 - 99,100	3,410 - 152,000
* Lead	ND	8.2 - 15.3	9.5 - 34.6
Manganese	1,060 - 12,200	1,360 - 16,000	4,220 - 5,630
Nickel	53.8 - 129	48.3	100 - 207
Silver	ND	5.6	ND
Sodium	4,280 - 35,300	35,400 - 390,000	17,000 - 28,700
Vanadium	34.7	27.6	94.8
Zinc	1,380 - 3,200	59.1 - 859	192 - 1,070

(a) The reported range represents concentrations found at shallow and intermediate depths within the well.

(b) Well 1.

(c) Well 2.

(d) Well 4.

ND = Not detected.

\* = Selected as chemical of potential concern.

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**TABLE 8 (continued)**  
**SUMMARY OF CHEMICALS DETECTED IN ON-SITE SUBSURFACE SOIL**  
**PASLEY SOLVENTS AND CHEMICALS (a)**

(Concentrations reported in mg/kg)

Chemical	Frequency of Detection (b)	Range of Detected Concentrations
<b>Organic Chemicals:</b>		
• Acenaphthene	1 / 8	0.31
• Anthracene	2 / 8	0.16 - 0.17
• Chloroform	1 / 7	0.0058
• Chrysene	3 / 8	0.019 - 0.12
• Dibenzofuran	3 / 8	0.32 - 0.42
• 1,1-Dichloroethane	1 / 7	0.0073
• 1,2-Dichloroethane	1 / 1	0.05
• trans-1,2-Dichloroethene	1 / 7	0.05
• Di-n-octylphthalate	2 / 8	0.13 - 0.14
• Ethylbenzene	5 / 8	0.18 - 1.1
• bis(2-Ethylhexyl)phthalate	2 / 5	0.71 - 4.9
• Fluoranthene	5 / 8	0.045 - 0.16
• Fluorene	4 / 8	0.18 - 0.62
• 4-Methyl-2-pentanone	1 / 8	1.8
• Methylene Chloride	5 / 8	0.0098 - 0.60
• 2-Methylnaphthalene	6 / 8	0.48 - 7.6
• Naphthalene	5 / 8	0.25 - 4.2
• Phenanthrene	7 / 8	0.12 - 1.5
• Pyrene	6 / 8	0.049 - 0.21
• Tetrachloroethene	7 / 8	0.12 - 11
• Toluene	7 / 8	0.0048 - 2.9
• 1,1,1-Trichloroethane	2 / 8	0.036 - 0.16
• Trichloroethene	4 / 8	0.042 - 1.4
• Xylenes (total)	7 / 8	0.0073 - 4.8
<b>Inorganic Chemicals:</b>		
• Aluminum	8 / 8	2,300 - 11,400
• Antimony	1 / 8	4.5
• Arsenic	2 / 8	1.1 - 1.2
• Barium	3 / 8	22.2 - 110
• Beryllium	1 / 8	0.4
• Cadmium	1 / 8	0.4
• Cobalt	6 / 8	2.9 - 5.6
• Copper	8 / 8	11.5 - 24.4
• Magnesium	8 / 8	304 - 1,110
• Mercury	7 / 8	0.1 - 0.5
• Nickel	5 / 8	3.9 - 7.1
• Potassium	5 / 8	210 - 460
• Silver	3 / 8	1.9 - 2.9
• Sodium	6 / 6	44.9 - 136
• Vanadium	8 / 8	4.6 - 18.4

(a) Samples BH-1 - BH-8.

(b) The number of samples in which the chemical was detected divided by the total number of samples analyzed for that chemical.

• = Selected as chemical of potential concern.

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TABLE 9

**POTENTIAL EXPOSURE PATHWAYS FOR THE PASLEY SOLVENTS AND CHEMICALS SITE  
CURRENT LAND USE CONDITIONS**

Exposure Medium	Source and Mechanism of Release	Potential Receptor	Exposure Route	Potential for Significant Exposure	Method of Evaluation
Surface Soil	Past spills and direct discharge from on site tanks to surface soil	Trespassers	Incidental ingestion, dermal absorption	None. Site soil has been covered by gravel and access is restricted. No potential for direct contact or incidental ingestion exists.	None. Incomplete pathway.
Subsurface Soil	Direct discharge from on site tanks or leaching from surface soils	Trespassers	Incidental ingestion, dermal absorption	None. Persons do not come into contact with subsurface soil.	None. Incomplete pathway.
Groundwater	Leaching to groundwater from soil; Migration to public water supply wells	Residents	Ingestion, inhalation, and dermal absorption of chemicals during home use	None. Site related contamination has not migrated to public supply wells, and no private residential wells exist near or downgradient of the site.	None. Incomplete pathway.
Air (vapors)	Volatilization of chemicals from soil to air	Trespassers	Inhalation	None. Although volatilization of chemicals may occur, access to the site is restricted.	None. Incomplete pathway.
Air (vapors)	Volatilization of chemicals from soil to air	Nearby residents	Inhalation	Low. Dispersion in ambient air significantly decreases concentrations of chemicals.	Quantitative. Emission estimates will be based on measured surface soil concentrations.
Air (dust)	Dust released from surface soil to air	Trespassers/ Nearby residents	Inhalation	Negligible. Dust generation is unlikely because site soil has been covered by gravel. Further, site access is restricted and trespassers are not expected.	None. Incomplete pathway.

**TABLE 9 (continued)**  
**POTENTIAL EXPOSURE PATHWAYS FOR THE PASLEY SOLVENTS AND CHEMICALS SITE**  
**FUTURE LAND USE CONDITIONS**

Exposure Medium	Source and Mechanism of Release	Potential Receptor	Exposure Route	Potential for Significant Exposure	Method of Evaluation
Surface Soil	Past spills and direct discharge from on site tanks to surface soil	Workers	Incidental ingestion, dermal absorption	Low to high depending on nature of activities at the site and the degree of vegetation or pavement at the site.	Quantitative. Estimates will be based on current surface soil concentrations.
Subsurface Soil	Direct discharge from on site tanks or leaching from surface soils	Workers	Incidental ingestion, dermal absorption	Low. Contact with subsurface soils is likely to be infrequent and of short duration.	None.
Groundwater	Leaching to groundwater from soil; Pumping from an on site well	Workers	Ingestion of drinking water	Moderate to high if use occurs.	Quantitative.
Groundwater	Migration to residential well adjacent to site	Nearby Resident	Ingestion and inhalation and dermal absorption of chemicals during home use	Moderate to high for ingestion and inhalation if use occurs. Negligible for dermal absorption compared to ingestion and inhalation.	Quantitative. Estimates will be based on measured groundwater concentrations.
Air (vapors)	Volatilization of chemicals from soil to air	Workers	Inhalation	Moderate. Volatilization of chemicals from on site soil will occur.	Quantitative. Emission estimates will be based on measured current soil concentrations.

TABLE 10  
ORAL CRITICAL TOXICITY VALUES FOR CHEMICALS OF POTENTIAL CONCERN  
PASLEY SOLVENTS AND CHEMICALS

Chemical	Chronic RfD (mg/kg-day)	Uncertainty factor (a)	Target Organ (b)	RfD Source	Slope Factor (SF) (mg/kg-day) <sup>-1</sup>	EPA Weight of Evidence Classification (c)	SF Source
<b>Organics:</b>							
Acenaphthene	6.00E-02	3,000	Liver	IRIS	---	---	---
Anthracene	3.00E-01	3,000	None observed	IRIS	---	0	IRIS
Benzene	---	---	---	IRIS	2.90E-02	A	IRIS
Chloroform	1.00E-02	1,000	Liver	IRIS	6.10E-03	B2	IRIS
Chrysene	---	---	---	---	---	B2	IRIS
Dibenzofuran	---	---	---	NEAST	---	0	IRIS
1,1-Dichloroethane	1.00E-01	1,000	Kidney	NEAST	---	C	IRIS
1,2-Dichloroethane	---	---	---	IRIS	9.10E-02	B2	IRIS
1,1-Dichloroethene	9.00E-03	1,000	Liver	IRIS	6.00E-01	C	IRIS
cis-1,2-Dichloroethene	---	---	---	---	---	0	IRIS
trans-1,2-Dichloroethene	2.00E-02	1,000	Liver	IRIS	---	---	---
Di-n-butylphthalate	1.00E-01	1,000	Mortality	IRIS	---	---	---
Di-n-octylphthalate	2.00E-02	1,000	Liver/Kidney	NEAST	---	---	---
Ethyl Benzene	1.00E-01	1,000	Liver/Kidney	IRIS	---	0	IRIS
Bis(2-ethylhexyl)phthalate	2.00E-02	1,000	Liver	IRIS	1.40E-02	B2	IRIS
Fluoranthene	4.00E-02	3,000	Kidney/Liver	IRIS	---	---	---
Fluorene	4.00E-02	3,000	Hematology	IRIS	---	0	IRIS
Methylene Chloride	6.00E-02	100	Liver	IRIS	7.50E-03	B2	IRIS
2-Methylnaphthalene	---	---	---	---	---	---	---
Naphthalene	4.00E-03	10,000	<Body Weight	NEAST	---	0	IRIS
Phenanthrene	---	---	---	NEAST	---	0	IRIS
Pyrene	3.00E-02	3,000	Kidney	IRIS	---	0	IRIS
Tetrachloroethene	1.00E-02	1,000	Liver	IRIS	5.10E-02	B2	NEAST
Toluene	2.00E-01	1,000	Liver/Kidney	IRIS	---	0	IRIS
1,1,1-Trichloroethane	9.00E-02	1,000	Liver	IRIS	---	0	IRIS
Trichloroethene	7.35E-03	1,000	Liver	NA	1.10E-02	B2	NEAST
Vinyl Chloride	---	---	---	---	1.90E+00	A	NEAST
Xylenes (total)	2.00E+00	100	CNS, Mortality	IRIS	---	0	IRIS

TABLE 10 (continued)

INHALATION CRITICAL TOXICITY VALUES FOR CHEMICALS OF POTENTIAL CONCERN  
PASLEY SOLVENTS AND CHEMICALS

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Chemical	Chronic RfD (mg/kg-day)	Uncertainty Factor (a)	Target Organ (b)	RfD Source	Unit Risk (UR) (ug/m <sup>3</sup> )-1	EPA Weight of Evidence Classification (c)	UR Source
<b>Organics:</b>							
Benzene	---	---	---	IRIS	8.30E-06	A	IRIS
Chloroform	---	---	---	IRIS	2.30E-05	B2	IRIS
1,1-Dichloroethane	1.00E-01	1,000	Kidney	NEAST	---	C	IRIS
1,1-Dichloroethene	---	---	---	IRIS	5.00E-05	C	IRIS
trans-1,2-Dichloroethene	---	---	---	IRIS	---	---	---
Di-n-butylphthalate	---	---	---	IRIS	---	---	---
Ethyl Benzene	(1.00E+00) *	300	Development	IRIS	---	D	IRIS
bis(2-Ethylhexyl)phthalate	---	---	---	IRIS	---	B2	IRIS
Tetrachloroethene	---	---	---	IRIS	5.20E-07	B2	NEAST
Toluene	(2.00E+00) *	100	CNS, Irritation	NEAST	---	D	IRIS
1,1,1-Trichloroethane	3.00E-01	1,000	Liver	NEAST	---	D	IRIS
Trichloroethene	---	---	---	IRIS	1.70E-06	B2	NEAST
Vinyl Chloride	---	---	---	---	8.40E-05	A	NEAST
Nylenes (total)	(3.00E-01) *	100	CNS, respiratory	NEAST	---	D	IRIS
<b>Inorganics:</b>							
Aluminum	---	---	---	NEAST	---	---	---
Antimony	---	---	Cancer	IRIS	---	---	---
Arsenic	---	---	Cancer	---	4.00E-03 (d)	A	IRIS
Barium	(5.00E-04) *	1,000	Teratogenicity	NEAST	---	---	---
Beryllium	---	---	---	IRIS	2.40E-03	B2	IRIS
Chromium III and Compounds	(2.00E-06) *	300	nasal Mucosa	NEAST	---	---	---
Chromium VI and Compounds	(2.00E-06) *	300	nasal Mucosa	NEAST	1.20E-02	A	IRIS
Cobalt	---	---	---	---	---	---	---
Cyanide	---	---	---	IRIS	---	---	---
Lead	---	---	CNS	IRIS	---	B2	IRIS
Manganese	(4.00E-04) *	900	CNS, Respiratory	NEAST	---	D	IRIS
Nickel refinery dust	---	---	---	IRIS	2.40E-04	A	IRIS
Nickel subsulfide	---	---	---	IRIS	4.80E-04 (e)	A	IRIS
Silver	---	---	---	IRIS	---	---	---
Thallium (in soluble salts)	---	---	---	NEAST	---	---	---
Vanadium	---	---	---	NEAST	---	---	---
Zinc and compounds	---	---	---	NEAST	---	D	IRIS

(a) Uncertainty factors are a measure of the uncertainty in the data available. A higher uncertainty factor represents a greater amount of uncertainty in the data.

(b) A target organ is the organ most sensitive to a chemical's toxic effect. RfDs are based on toxic effects in the target organ. If an RfD was based on a study in which a target organ was not identified, an organ or system known to be affected by the chemical is listed.

(c) EPA Weight of Evidence for Carcinogenic Effects:

(A) = Human carcinogen based on adequate evidence from human studies;

(B2) = Probable human carcinogen based on inadequate evidence from human studies and adequate evidence from animal studies;

(C) = Possible human carcinogen based on limited evidence from animal studies in the absence of human studies;

(D) = Not classified as to human carcinogenicity; and

(d) An absorption factor of 30% was used to calculate the unit risk from the slope factor.

(e) The cancer unit risk for nickel subsulfide was conservatively used to calculate the risks associated with inhalation of nickel.

NOTE: IRIS = Integrated Risk Information System.  
NEAST = Health Effects Assessment Summary Tables.  
-- = No information available.  
\* = Value is a unit risk in mg/m<sup>3</sup>.

TABLE 11

SUMMARY OF POTENTIAL HEALTH RISKS ASSOCIATED WITH THE  
PASLEY SOLVENTS AND CHEMICALS SITE

Exposure Pathway	Upper Bound Excess Lifetime Cancer Risk <sup>a</sup>	Hazard Index for Noncarcinogenic Effects <sup>b</sup>
<u>CURRENT LAND USE:</u>		
Inhalation		
0-30 Year Old Residents	$8 \times 10^{-7}$	<1
Adult Residents	$8 \times 10^{-7}$	<1
<u>FUTURE LAND USE:</u>		
Soil Ingestion		
Workers	$2 \times 10^{-6}$	<1
Dermal Absorption from Soil Matrix		
Workers	$2 \times 10^{-6}$	<1
Inhalation		
Workers	$7 \times 10^{-5}$	<1
Ingestion of Upgradient Upper Glacial Groundwater		
Workers	$3 \times 10^{-5}$	<1
0-30 Year Old Residents	$2 \times 10^{-4}$	<1
Adult Residents	$1 \times 10^{-4}$	<1
Ingestion of On Site Upper Glacial Groundwater		
Workers	$2 \times 10^{-4}$	>1
0-30 Year Old Residents	$9 \times 10^{-4}$	>1
Adult Residents	$7 \times 10^{-4}$	>1
Ingestion of Downgradient Upper Glacial Aquifer Groundwater		
0-30 Year Old Residents	$5 \times 10^{-4}$	>1
Adult Residents	$4 \times 10^{-4}$	>1
Ingestion of Upgradient Upper Magoghy Aquifer Groundwater		
Workers	—	<1
0-30 Year Old Residents	—	<1
Adult Residents	—	<1

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TABLE 11 (Continued)

SUMMARY OF POTENTIAL HEALTH RISKS ASSOCIATED WITH THE  
PASLEY SOLVENTS AND CHEMICALS SITE

Exposure Pathway	Upper Bound Excess Lifetime Cancer Risk <sup>a</sup>	Hazard Index for Noncarcinogenic Effects <sup>b</sup>
<b>FUTURE LAND USE (cont.):</b>		
Ingestion of On Site Upper Magothy Aquifer Groundwater		
Workers	$3 \times 10^{-5}$	<1
0-30 Year Old Residents	$1 \times 10^{-4}$	1
Adult Residents	$1 \times 10^{-4}$	<1
Ingestion of Downgradient Upper Magothy Aquifer Groundwater		
0-30 Year Old Residents	$2 \times 10^{-5}$	<1
Adult Residents	$3 \times 10^{-5}$	<1
Inhalation While Showering with Upgradient Upper Glacial Groundwater		
Adult Residents	$7 \times 10^{-6}$	—
Inhalation While Showering with On Site Upper Glacial Groundwater		
Adult Residents	$2 \times 10^{-4}$	<1
Inhalation While Showering with Downgradient Upper Glacial Groundwater		
Adult Residents	$3 \times 10^{-5}$	<1
Inhalation While Showering with Upgradient Upper Magothy Groundwater		
Adult Residents	NE	NE
Inhalation While Showering with On Site Upper Magothy Groundwater		
Adult Residents	$4 \times 10^{-6}$	<1
Inhalation While Showering with Downgradient Upper Magothy Groundwater		
Adult Residents	$4 \times 10^{-6}$	—

<sup>a</sup> The upperbound individual excess lifetime cancer risk represents the additional probability that an individual may develop cancer over a 70-year lifetime as a result of exposure conditions evaluated.

<sup>b</sup> The hazard index indicates whether or not exposure to mixtures of noncarcinogenic chemicals may result in adverse health effects. A hazard index less than one indicates that adverse human health effects are unlikely to occur.

— = Not applicable. Chemicals of potential concern for this pathway do not exhibit carcinogenic (or noncarcinogenic) effects.

NE = Not evaluated. Pathway only evaluated for chemicals of concern which volatilize.

TABLE 12 POTENTIAL ARARS FOR GROUNDWATER CONTAMINANTS  
PASLEY SOLVENTS AND CHEMICAL SITE

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	MAXIMUM CONCENTRATION DETECTED IN ON-SITE WELLS 23 & 24	MOST STRINGENT ARAR	MOST STRINGENT GOAL TO BE CONSIDERED	ARARS			GOAL TO BE CONSIDERED						
				FEDERAL SDWA MCL (a)	NY AMBIENT WATER QUALITY STANDARDS (b)	NY GROUNDWATER QUALITY STANDARDS (c)	PROPOSED FEDERAL SDWA MCL (d)	FEDERAL SDWA MCL (d)	NY AMBIENT WATER QUALITY VALUES (a)	EPA DRINKING WATER HEALTH ADVISORIES (b)	EPA AMO DW ONLY (c)	REFERENCE CONCENTRATION FOR POTENTIAL CARCINOGENS (d)	
VOLATILE ORGANICS COMPOUNDS													
Methylene Chloride	16J	5	0	NS	5(p)	NS	0P	5	NS	NS	0(0.10)	4.7	
Benzene	43J	ND	0	5	ND(p)(b)	ND	0	NS	NS	NS	0(0.67)	1.2	
Acetone	3800J	50	NS	NS	NS	NS	NS	NS	50G	NS	NS	NS	
Chloroform	74J	100	0	NS	100(p)(b)	100	NS	NS	NS	NS	0(0.10)	5.7	
1,1 - Dichloroethene	84J	5	0	7	5(p)	NS	7	NS	NS	NS	0(0.30)	.06	
1,1 - Dichloroethene	630	5	NS	NS	5(p)	NS	NS	NS	NS	NS	NS	NS	
Trans - 1,2 - Dichloroethene	37,000	5	100	100	5(p)	NS	100	NS	NS	350	NS	NS	
Ethylbenzene	510	5	700	700	5(p)	NS	700	NS	NS	3,400	2,400	NS	
Tetrachloroethene	160J	5	0	5	5(p)	NS	0	NS	NS	NS	0(0.00)	.7	
Toluene	1100	5	1000	1000	5(p)	NS	1000	NS	NS	10,000	10,000	NS	
Trichloroethene	320	5	0	5	5(p)	10	0	NS	NS	NS	0(2.0)	3.2	
1,1,1 - Trichloroethene	3800	5	200	200	5(p)	NS	200	NS	NS	1,000	10,000	NS	
Chlorobenzene	510	5	100	100	5(p)	NS	100	NS	NS	3,150	400	NS	
Xylene (Total)	817.3	5	2,200	10,000	5(p)(b)	NS	10,000	NS	NS	2,200	NS	NS	
SEMI-VOLATILE ORGANIC COMPOUNDS													
di - n - butyl phthalate	40	50	44,000	NS	NS	NS	NS	NS	50G(p)	NS	44,000	NS	
2 - Methylnaphthalene	110	50	NS	NS	NS	NS	NS	NS	50G	NS	NS	NS	
Naphthalene	270	10	NS	NS	NS	NS	NS	NS	10G(p)	NS	NS	NS	
Dibenzofuran	5J	50	NS	NS	NS	NS	NS	NS	50G	NS	NS	NS	
Phenanthrene	5J	50	NS	NS	NS	NS	NS	NS	50G(p)	NS	NS	NS	
di - n - Octyl phthalate	2J	50	NS	NS	NS	NS	NS	NS	50G(p)	NS	NS	NS	
Acenaphthylene	21	50	NS	NS	NS	NS	NS	NS	50G	NS	NS	NS	
Acenaphthene	7J	20	20	NS	NS	NS	NS	NS	20G(p)	NS	20	NS	
Fluorene	7J	50	NS	NS	NS	NS	NS	NS	50G(p)	NS	NS	NS	
Bis(2 - ethylhexyl)phthalate	40	50	2.5	NS	NS	NS	NS	NS	50G	NS	NS	2.5	

TABLE 12 Cont'd POTENTIAL ARARS: GROUNDWATER CONTAMINANTS  
PASLEY SOLVENTS AND CHEMICAL SITE

PAI 001 1520

	MAXIMUM CONCENTRATION DETECTED IN ON-SITE WELLS 29 & 31	MOST STRINGENT ARAR	MOST STRINGENT GOAL TO BE CONSIDERED	ARARS			GOAL TO BE CONSIDERED					
				FEDERAL	NY AMBIENT	NY	FEDERAL	PROPOSED	NY AMBIENT	EPA DRINKING	REFERENCE	
				SDWA	WATER	GROUNDWATER	SDWA	FEDERAL	WATER	WATER	CONCENTRATION	
				MCL	QUALITY	QUALITY (1)	MCL	MCL	QUALITY	HEALTH	FOR POTENTIAL	
				(1)	STANDARDS (2)	(1)	(1)	(1)	VALUES (2)	(1)	(1)	(1)
METALS	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Aluminum	97,400	100	50	NS	100(2)	NS	50 - 200(2)	NS	NS	NS	NS	NS
Arsimony	39.9	3	3	NS	3	NS	3P	10/5(m)	NS	NS	146	NS
Arsenic	-	25	20	50	25	25	50P	NS	NS	50	(25 ng/l)	20
Barium	372	1,000	1,000	1,000	1,000	1,000	5,000P	NS	NS	1,800	NS	NS
Beryllium	6.6	1	0	NS	30	NS	0P	1	NS	NS	(3.9 ng/l)	200
Cadmium	4.5	5	5	5	10	10	5	NS	NS	16	10	NS
Calcium	38,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	255	50	50	100	50	50	100	NS	NS	170	50	NS
Cobalt	45.1	5	NS	NS	5(2)	NS	NS	NS	NS	NS	NS	NS
Copper	279	200	1,000	NS	200	1,000	1300P	1300	NS	NS	1000	NS
Cyanide	76	100	200	NS	100	200	200P	200	NS	750	200	NS
Iron	152,000	300	NS	NS	300 (2)	300(2)	300(2)	NS	NS	NS	NS	NS
Lead	34.6	15	0	15	25	25	0P	NS	NS	20 ug/day	50	NS
Magnesium	6330	35,000	NS	NS	35,000 (G)	NS	NS	NS	NS	NS	NS	NS
Manganese	16,100	50	NS	NS	300(2)	300(2)	50(2)	NS	NS	NS	NS	NS
Mercury	-	2	2	2	2	2	2	NS	NS	5.5	10	NS
Nickel	310	100	15.4	NS	(1)(2)	NS	100P	100	NS	350	15.4	NS
Potassium	10,200	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	-	10	10	50	10	20	50	NS	NS	NS	10	NS
Silver	5.61	50	50	NS	50	50	100(2)	NS	NS	NS	50	NS
Sodium	300,000J	20,000	NS	NS	20,000	NS	NS	NS	NS	NS	NS	NS
Thallium	5.7	1	17.6	NS	40	NS	NS	2/1 (2)	NS	NS	17.6	NS
Vanadium	94.9	14	NS	NS	14(2)	NS	NS	NS	NS	NS	NS	NS
Zinc	3,200	300	5,000	NS	300	500	5,000(2)	NS	NS	NS	5000	NS

NS = NOT  
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TABLE 12 continued

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NOTES:

J - ANALYTE PRESENT. REPORTED VALUES MAY NOT BE ACCURATE OR PRECISE.

P - PROPOSED VALUE

NS - NO STANDARD OR GUIDELINE EXISTS

G - GUIDANCE VALUES

ND - NOT DETECTABLE

(a) SAFE DRINKING WATER ACT MAXIMUM CONTAMINANT LEVEL

(b) 6 NYCRR PARTS 701 AND 702 AND 10 NYCRR PARTS 170 AND 5 AS SUMMARIZED IN NYSDEC DIVISION OF WATER TECHNICAL AND OPERATIONALS GUIDANCE SERIES

(1.1.1) SEPT. 25, 1990.

(c) 6 NYCRR PART 703

(d) SAFE DRINKING WATER ACT MAXIMUM CONTAMINANT LEVEL GOALS

(e) EPA DRINKING WATER HEALTH ADVISORIES, SUPERFUND PUBLIC HEALTH EVALUATION MANUAL, 1996

(f) EPA AMBIENT WATER QUALITY CRITERIA FOR PROTECTION OF HUMAN HEALTH ADJUSTED FOR DRINKING WATER ONLY (CONCENTRATIONS IN PARENTHESES CORRESPOND TO MIDPOINT OF RISK RANGE FOR POTENTIAL CARCINOGENS ONLY)

(g) CORRESPONDS TO AN INCREASED LIFETIME CANCER RISK OF  $1E-6$ , CALCULATED FROM SLOPE FACTORS PUBLISHED IN THE HEALTH EFFECTS ASSESSMENT SUMMARY TABLES (1991) AS FOLLOWS: REFERENCE CONCENTRATION =  $(1E-6 \times 70 \text{ KG}) / (\text{SLOPE FACTOR IN } (\text{MG/KG/DAY}) \times 2 \text{ L/DAY})$

(h) TOTAL ORGANIC CHEMICALS CANNOT EXCEED 100 UG/L

(i) PROPOSED FOR REVISION

(j) APPLIES TO EACH ISOMER INDIVIDUALLY

(k) SECONDARY MCL

(l) NO HUMAN HEALTH STANDARDS. THIS STANDARD IS FOR PROTECTION OF AQUATIC LIFE.

(m) TWO OPTIONS PROPOSED BY EPA RESULTING IN DIFFERENT STANDARDS.

(n) IF IRON & MANGANESE ARE PRESENT, THE TOTAL CONCENTRATION OF BOTH SHOULD NOT EXCEED 500 MG/L

(o) FORMULA TO DETERMINE STANDARD  $\text{EXP}(0.76 \ln (\text{PPM HARDNESS})) + 1.08$

TABLE 13  
Recommended soil cleanup objectives (ng/kg or ppm)  
Pasley Solvents Site, B 1-30-016

PAI 001 1522

Contaminant	Solubility mg/l or ppm S	Partition coefficient Koc	Groundwater Standards/ Criteria Cu ug/l or ppb.	a Allowable Soil conc. ppm. Cs	b Soil Cleanup objectives to Protect GHI Quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	MMH Rec. soil Cleanup Obj. (ppm)
						Carcinogens	Systemic Toxicants		
Xylenes	198	240	5	0.012	1.2	N/A	200,000	---	1.2
Ethylbenzene	152	1,100	5	0.055	5.5	N/A	0,000	5	5.5
Toluene	535	300	5	0.015	1.5	N/A	2,000	5	1.5
Tetrachloroethene	150	277	5	0.014	1.4	14	800	5	1.5
Trichloroethene	1,100	126	5	0.007	0.70	64	N/A	5	1.0
1,1,1-Trichloroethene	1,500	152	5	0.0076	0.76	N/A	7,000	5	1.0
1,2-Dichloroethene (trans)	6,300	59 <sup>N</sup>	5	0.003	0.3	N/A	N/A	5	0.5
Chloroform	0,200	31 <sup>N</sup>	7	0.002	0.2	114	800	5	0.2
1,2-Dichlorobenzene	100	1,700 <sup>N</sup>	1.7	0.079	7.9	N/A	N/A	330	8.0 <sup>MMH</sup>
Phenanthrene	1.0	1,365 <sup>N</sup>	50	2.20	220.0	N/A	N/A	330	50.0 <sup>MMH</sup>
Fluorenone	0.206	30,000	50	19	1900.0	N/A	3,000	330	50.0 <sup>MMH</sup>
Naphthalene	31.70	1,300 <sup>N</sup>	10	0.130	13.0	N/A	300	330	13.0
2-methylnaphthalene	26.00	727 <sup>N</sup>	50	0.365	36.0	N/A	N/A	330	36.0
Di-n-butyl phthalate	400	162 <sup>N</sup>	50	0.08	8.0	N/A	8,000	330	8.0

- a. Allowable Soil Concentration  $C_s = f \times C_u \times K_{oc}$   
b. Soil cleanup objective =  $C_s \times$  Correction Factor (CF)

MMH is Method Detection Limit

<sup>N</sup> Partition coefficient is calculated by using the following equation:

$\log K_{oc} = -0.55 \log S + 3.64$ . Other values are experimental values.

MMH Correction Factor (CF) of 100 is used as per proposed TAGM

MMH As per proposed TAGM, Total VOCs  $\leq 10$  ppm., Total Semi-VOCs  $\leq 500$  ppm. and Individual Semi-VOCs  $\leq 50$  ppm.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 12,  
and should be adjusted for the actual soil organic carbon content if it is known.

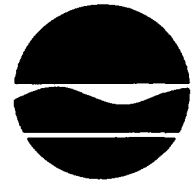
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**APPENDIX 3**

PAL 001 1523

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**New York State Department of Environmental Conservation**  
60 Wolf Road, Albany, New York 12233 - 7010



**Thomas C. Jorling**  
Commissioner

**MAR 18 1992**

Ms. Carole Petersen  
Chief  
NY/Caribbean Superfund Branch II  
U.S. Environmental Protection Agency  
Region II  
26 Federal Plaza  
New York, NY 10278

Dear Ms. Petersen:

Re: Pasley Solvents & Chemicals Site ID No. 130016  
Draft Record of Decision

The New York State Department of Environmental Conservation (NYSDEC) has reviewed the March 13, 1992 draft Record of Decision (ROD) for the Pasley Solvents and Chemicals site, as telexed to us on March 16, 1992.

The remedy presented in the draft ROD includes treating contaminated soil via soil vacuuming followed by soil flushing, if necessary, and treating groundwater via metals precipitation/air stripping with vapor phase granular activated carbon/GAS polishing.

As per conversations between our respective staff, this March 13 draft reflects the several changes made to the March 5, 1992 draft. Consequently, the NYSDEC concurs with the draft ROD for the Pasley Solvents and Chemicals site.

Sincerely,

Edward O. Sullivan  
Deputy Commissioner

cc: M. Hauptmann, USEPA-Region II  
S. Henry, USEPA-Region II

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APPENDIX 4

PAI 001 1525

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RESPONSIVENESS SUMMARY  
FOR THE REMEDIAL ACTION  
AT THE  
PASLEY SOLVENTS AND CHEMICALS SUPERFUND SITE  
TOWN OF HEMPSTEAD, NASSAU COUNTY, NEW YORK

<u>Section</u>	<u>Page</u>
INTRODUCTION.....	1
I. OVERVIEW.....	2
II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS.....	3
III. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES.....	4

PAL 001 1526

**RESPONSIVENESS SUMMARY  
FOR THE  
PASLEY SOLVENTS AND CHEMICALS SITE  
TOWN OF HEMPSTEAD, NEW YORK**

**INTRODUCTION**

This Responsiveness Summary provides a summary of citizen's comments and concerns and the U.S. Environmental Protection Agency's (EPA) responses to those comments regarding the Remedial Investigation/Feasibility Study (RI/FS) Reports and Proposed Plan for the Pasley Solvents and Chemicals Site (Pasley Site or Site). EPA, in consultation with the New York State Department of Environmental Conservation (NYSDEC), will select a final cleanup remedy for the Pasley Site only after reviewing and considering all public comments received during the public comment period.

EPA held a public comment period from February 14, 1992 through March 15, 1992 to provide interested parties with the opportunity to comment on the RI/FS and Proposed Plan for the Pasley Site.<sup>1</sup> A Public Information Meeting was held to discuss the remedial alternatives described in the FS and to present EPA's preferred remedial alternatives for controlling contamination at the Site. The meeting was held at the Town of Hempstead Town Hall, Hempstead, New York on March 5, 1992 at 7:00 p.m.

Community interest appears primarily to focus on ground water contamination on Long Island rather than the Site and EPA's Proposed Plan. Approximately 15 people attended the meeting. The audience consisted of a representative from the local environmental citizens' group, local businessmen, residents, and state and local government officials. Since there were only a few questions from the audience, the question and answer session was brief. EPA was asked to clarify some specifics of the Proposed Plan. A summary of the questions posed during the meeting are provided in Section III.

This community relations responsiveness summary is divided into the following sections:

- I. **OVERVIEW:** This section briefly outlines the EPA's preferred remedial alternative.
- II. **BACKGROUND:** This section provides a brief history of community concerns and interests regarding the Pasley Site.

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<sup>1</sup> Written comments prepared by ERM Northeast (ERM) on behalf of a group of defendants in Commander Oil Corporation v. Advance Food Service Equipment et al., 90 Civ. 1243 (E.D.N.Y.) are also included in this Responsiveness Summary.

**III. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES:** This section summarizes oral comments received by EPA at the public meeting for the Pasley Site and those raised in written comments by ERM-Northeast.

**I. OVERVIEW**

At the time of the public comment period, EPA published its preferred alternative for the Pasley Site located in the Town of Hempstead, Nassau County, New York. EPA generally prefers treatment or removal technologies which reduce the toxicity, mobility, or volume of waste contaminants.

EPA screened possible alternatives, giving consideration to nine key criteria:

Threshold criteria, including

- Overall protection of human health and the environment
- Compliance with Federal, State, and local environmental and health laws

Balancing criteria, including

- Long-term effectiveness
- Short-term effectiveness
- Reduction of mobility, toxicity, or volume
- Ability to implement
- Cost, and

Modifying criteria, including

- State acceptance, and
- Local acceptance.

EPA weighed State and local acceptance of the remedy prior to reaching the final decision regarding the remedy for the Site.

EPA's selected alternatives for cleaning up contaminated soils and ground water at the Site are: Soil Treatment Alternative 7 - Soil Vacuuming and Soil Flushing; and Ground Water Treatment Alternative 4 - Metals Precipitation/Air Stripping with Vapor Phase Granular

Activated Carbon/GAC Polishing. Based on current information, the preferred alternatives provide the best balance of trade-offs among the alternatives, with respect to the nine criteria, above, that EPA uses to evaluate alternatives.

## II. BACKGROUND

Community concern appears high in relation to the overall issue of ground water contamination on Long Island but minimal in regarding the Pasley Site in particular.

To obtain public input on the feasibility study report and the proposed remedy, EPA held a public comment period from February 14 to March 15, 1992, and accepted written comments from ERM on March 31, 1992.

EPA's community relations efforts included preparation of a community relations plan (CRP) in October 1987; an informational public meeting on the Work Plan for the Remedial Investigation and Feasibility Study (RI/FS) on October 26, 1988; and the establishment of site information repositories, which contain the RI/FS Report and other relevant documents, located at EPA Region II office in New York City and the Nassau Library System ; and a public meeting notice that appeared in the February 14, 1992 edition of Newsday. In addition, EPA prepared a Fact Sheet, describing the Agency's proposed plan for the Site. This proposed plan fact sheet was sent to the information repository and distributed to citizens and officials listed on EPA's site mailing list in November 1991. A public meeting was held on March 5, 1992.

The CRP for the Pasley Site states that the community's primary request at the onset of RI/FS activities was that accurate information regarding the Site be made available to the public. The local official and community residents who were interviewed during the development of the CRP, expressed interest in participating in the remedial decision making process and learning about the availability of a Technical Assistance Grant.

The issues raised at the March 5, 1992 public meeting were different from those originally identified in the CRP. Approximately 15 people, including a representative from the local environmental citizens' group, local businessmen, residents, and state and local government officials attended the meeting. During the question and answer session, EPA was asked to clarify some specifics of the Proposed Plan. A summary of the questions posed during the meeting is provided in Section III.

**III. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS  
AND RESPONSES**

This section summarizes oral comments raised at the public meeting and EPA's responses to these comments.

**A. SUMMARY OF QUESTIONS AND RESPONSES FROM THE PUBLIC MEETING  
CONCERNING THE PASLEY SOLVENTS AND CHEMICALS SUPERFUND SITE**

**COMMENT:**

A member of the Citizens Committee for Civic Action wanted to know if the contamination from the Pasley Site could mix with the contamination from the Purex site.

**EPA'S  
RESPONSE:**

The 100 parts per billion (ppb) total volatile organic compounds contaminant isopleth (line of equal concentration) from the Purex site, as defined by the Consent Order between Purex Company and the State of New York, is plotted on Figure 3 of the ROD. The isopleths for the Pasley Site are plotted in Figures 3 through 5 of the ROD. Based on the plots of the contaminant plumes for both the Pasley Site and the Purex site, EPA concluded that the two plumes are not intersecting; therefore the contamination from the plumes are not likely to mix. However, during the remedial design process, EPA and the NYSDEC will ensure that the effectiveness of the Pasley ground water remediation is not influenced by the ground water recovery system at the adjacent Purex site.

**COMMENT:**

The same citizen asked how long it would take to remediate the Site under EPA's proposed remedy.

**EPA'S  
RESPONSE:**

The soil remediation alternative is estimated to take approximately six (6) months for construction to be completed and two years for soil vacuuming to meet cleanup goals.

The groundwater remediation alternative is estimated to take two (2) years for construction to be completed and may take between 10 to 40 years for ground water cleanup goals to be attained, although a shorter period may actually be required.

The wide time range for cleanup goals for ground water to be attained is based on recent studies which have indicated that pumping technologies may contain uncertainties in achieving

the ppb concentrations required under State and Federal ground water cleanup criteria over a reasonable period of time. However, these studies also indicate significant decreases in contaminant concentrations early in system implementation, followed by a leveling out. For these reasons, the selected ground water treatment alternative stipulates contingency measures, whereby the groundwater extraction and treatment system's performance will be monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Modifications may include any or all of the following:

- a) at individual wells where cleanup goals have been attained, pumping may be discontinued;
- b) alternating pumping at wells to eliminate stagnation points;
- c) pulsed pumping to allow aquifer equilibration and to allow adsorbed contaminants to partition into groundwater; and
- d) installation of additional extraction wells to facilitate or accelerate cleanup of the contaminant plume.

If it is determined, on the basis of the preceding criteria and the system performance data, that certain portions of the aquifer cannot be restored to their beneficial use in a reasonable time frame, all or some of the following measures involving long-term management may occur, for an indefinite period of time, as a modification of the existing system:

- a) engineering controls such as physical barriers, source control measures, or long-term gradient control provided by low level pumping, as containment measures;
- b) chemical-specific ARARs may be waived for the cleanup of those portions of the aquifer based on the technical impracticability of achieving further contaminant reduction;
- c) institutional controls, in the form of local zoning ordinances, may be recommended to be implemented and maintained to restrict access to those portions of the aquifer which remain above remediation goals;
- d) continued monitoring of specified wells; and
- e) periodic reevaluation of remedial technologies for groundwater restoration.

The decision to invoke any or all of these measures may be made during a periodic review of the remedial action, which will occur at intervals of no less often than every five years.

COMMENT:

A citizen wanted to know if the plume would be contained during remediation or would it continue to migrate.

EPA'S  
RESPONSE:

Once groundwater begins to be extracted as part of the ground water remedial action, the plume would be contained. Accurate placement of the extractions wells is imperative so that the entire plume is captured. The location of these extraction wells would be determined in the remedial design phase.

COMMENT:

A citizen asked who will be paying for remediation of the Site including the operation and maintenance (O&M) for soil and ground water. Will the potentially responsible parties (PRPs) be responsible for the costs or will the Superfund pay for the cleanup?

EPA'S  
RESPONSE:

At the Pasley Site, Commander Oil Corporation, agreed to perform the RI/FS by signing an Administrative Order on Consent, Index NO. II-CERCLA-80212 on August 19, 1988. After the signing of the Record of Decision (ROD), EPA will mail notice letters to Commander and any additional PRPs that may be identified inviting them to implement the remedy as outlined in the ROD. If the PRPs agree to implement the ROD, they would enter into a Consent Decree with EPA which would be filed in the District Court for the Eastern District of New York. The Consent Decree would set forth the responsibilities and requirements for the remedial design and remedial action (RD/RA), with EPA oversight of these activities. If the PRPs do not agree to sign the Consent Decree, EPA may issue an order under Section 106 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) ordering the PRPs to implement the RD/RA. EPA may also elect to fund the work and seek to recover the response costs from the PRPs in a subsequent enforcement action.

COMMENT:

A member of the Citizens Committee for Civic Action wanted to know if EPA has been able to identify additional PRPs for this Site.

EPA'S  
RESPONSE:

Owners, operators, generators, or transporters of a hazardous substance, pollutant or contaminant which causes a release or a threat of a release at a site are considered as PRPs at that Superfund site. On February 28, 1992, EPA sent Information request letters to 26 parties. After the responses are reviewed, EPA will decide whether there is sufficient basis to send out notice letters for implementation of the ROD to the newly identified PRPs.

COMMENT:

A local citizen wanted to know what EPA's success rate has been for recovering costs.

EPA'S  
RESPONSE:

The EPA has been very successful at recovering costs from PRPs at numerous Superfund sites. In Region II, as of September 1991, EPA collected approximately \$36.7 million dollars in past costs and anticipates collecting at a minimum another \$7.5 million dollars by September 1992.

**B. SUMMARY OF WRITTEN COMMENTS AND EPA RESPONSES CONCERNING THE PASLEY SOLVENTS AND CHEMICALS SUPERFUND SITE PREPARED BY ERM-NORTHEAST (ERM) ON BEHALF OF A GROUP OF DEFENDANTS<sup>2</sup>**

Ground Water ARAR's

COMMENT:

1. The FS did not clearly identify ground water ARAR's [sic] which is contrary to the NCP-40CFR430(e)(2)(i)[sic].

EPA'S  
RESPONSE:

As outlined in the FS report, dated February, 1992, (p. 2-1 through p. 2-22) no single set of Federal or State criteria dictate acceptable concentrations in drinking water for all of the contaminants detected at the Pasley Site. For this reason, all chemical-specific ARARs to be considered were clearly outlined in Table 2-2. In addition, the FS states that

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<sup>2</sup> EPA reviewed and evaluated the Review and Critique Pasley Solvents and Chemicals Site Draft Feasibility Study, submitted by ERM. EPA's response references the text, as appropriate, and the Executive Summary provides an outline for the primary issues raised on the FS.



Federal and State safe drinking water program requirements are relevant and appropriate since potential or actual drinking water sources are potentially being impacted by the Pasley Site.

COMMENT:

2. The FS chose total volatile organics concentration values as opposed to compound specific levels to evaluate the effectiveness of remedial technologies. This approach is not appropriate to define ground water media to be remediated since health based ARAR'S for volatile organic compounds (VOC's) may vary considerably from compound to compound.

EPA'S  
RESPONSE:

The objective of plotting total volatile organics concentration was to define the extent of the ground water contamination, which is a requirement under the NCP. It is not necessary to define a plume based on ARARs because, as stated in the FS, "ARARs vary considerably from compound to compound." More importantly, during the remedial design each well will be resampled to define more fully the ground water contamination plume emanating from the Site. Furthermore, ground water clean-up goals will not be based on total volatile organics concentration, but on individual compounds as outlined in Table 2-2, of the FS report.

COMMENT:

3. The FS identifies metals as a concern for ground water quality. The data is based on unfiltered samples from monitoring wells which is likely unrepresentative of the formation water quality.

EPA'S  
RESPONSE:

Using unfiltered ground water samples for metals analysis is EPA's and NYSDEC's, conservative policy for protection of human health. However, as stated in the ROD at page 19, during the periodic sampling and analyses of the air stripper influent, if it is determined that metals concentrations are below standards and low enough not to cause malfunction of the air stripper, the metals precipitation portion of the treatment train may be eliminated.

Soil Remediation Goals

COMMENT:

4. Several of the ARARs identified on Table 2-2 of the FS are outdated and have been revised by the USEPA and NYSDEC.

EPA'S  
RESPONSE:

The ARARs Table 2-2, has been corrected in the FS.

COMMENT:

5. The FS does not define quantitative remediation goals for soil. The draft Baseline Risk Assessment prepared by ICF Technology Incorporated, on behalf of the USEPA, for the site does not support the conclusion\remediation objective in the FS that human contact with surface soil needs to be prevented.

EPA'S  
RESPONSE:

The conclusion reached in the baseline risk assessment was that the risks posed by the soil were within EPA's acceptable risk range. The soil remediation objective on page 3-1 of the FS that stated "prevent human contact with contaminated surface soils" has been corrected. The other objective for soil on page 3-1 of the FS is to "prevent or limit migration of contamination to ground water. To comply with this objective, EPA has elected to address the soil contamination. This is explained in the ROD on page 10, in the following manner: contaminants in the soils, if not addressed, will likely continue to contribute to further contamination of the ground water at the Site.

COMMENT:

6. The FS provides no documentation or technical support to justify the need to limit migration of chemicals in soil to ground water. Methods to predict the leaching of chemicals from soil into ground water (i.e., Organic Leaching Model-50 FR 37062) should be used to evaluate leaching impact potentials.

EPA'S  
RESPONSE:

As outlined on page 1-35 of the FS report, the compounds released to the soils at the Pasley Site may adsorb to soil particles, may escape to the atmosphere or may leach into underlying soils and ground water. From the results of the

RI, it can be seen that the chemicals that were detected in the soils at the Site were also detected in the ground water. In addition, the on-site shallow ground water monitoring well (MW-2S) indicated highest contamination as compared to the other seventeen (17) monitoring wells. The conclusion formulated from the RI results is that the surface soils on-site are the major source of the contamination to the ground water aquifer. The Organic Leaching Model-50 FR 37062 was not used to evaluate leaching impact potentials because the RI sampling results revealed migration from surface soil to ground water.

#### Ground Water Treatment Technology and Discharge

##### Comment:

7. Since the specific chemicals to be removed from the ground water have not been defined, the FS is not able to demonstrate how various treatment systems evaluated will be effective in remediating ground water.

##### EPA'S RESPONSE:

The specific chemicals to be removed from the ground water were defined in Table 2-2 of the FS. Further, all of the ground water treatment systems that were evaluated achieve ARARs to a similar degree. None of the ground water treatment systems that were evaluated would achieve chemical-specific ARARs for ground water as a potential drinking water supply. Achieving chemical-specific ARARs for ground water is dependent on remediation of upgradient sources. EPA believes that the proposed remedial action will result in attainment of chemical specific ground water ARARs provided upgradient sources are remediated so that they no longer impact the Upper Glacial aquifer.

EPA may invoke a technical waiver of the chemical-specific ARARs if the remediation program indicates that reaching MCLs in the glacial aquifer is technically impracticable.

##### COMMENT:

8. Emphasis on biological treatment in the FS is not supported by information in the FS or by the majority of the technologies selected and used for ground water treatment of VOC's. Treatability Studies should have been performed to assess the effectiveness of a biological system. However, ERM-Northeast recommends that the evaluation of biological treatment be dropped because it is not applicable to site ground water.

EPA'S  
RESPONSE:

Biological treatment was not evaluated for the majority of the technologies selected and used for ground water treatment of VOC's in the FS used to develop the Proposed Plan. The evaluation of biological treatment for each of the ground water treatment technologies was evaluated in an early draft of the FS report. In the FS, dated February, 1992, that is part of the administrative record and was placed in the information repositories, biological treatment was dropped from the treatment train because the chlorinated organic compounds (predominant chemicals of concern) are relatively insoluble and difficult to degrade biologically.

COMMENT:

9. The recommended remedial system for ground water treatment and recharge (ground water extraction, treatment-metals removal, air stripping with vapor phase activated carbon followed by activated carbon for polishing and ground water recharge) is expensive, requires a lengthy process for remediation, and would have numerous O&M problems. Experience has demonstrated that the recharging of Long Island ground water via injection wells is ineffective due to fouling from iron forming bacteria and clogging from particulates. Further, the FS did not evaluate the impacts that recharging would have on the ground water flow patterns.

EPA'S  
RESPONSE:

The selected remedial system for ground water treatment and recharge, as outlined in the ROD, is the most cost effective of the alternatives that were analyzed. Further, with the soil remediation that is proposed, the ground water treatment period should be reduced because the contaminated soil which is the major source of contamination to the ground water aquifer will be removed.

The remedial action selected by EPA calls for placing the treated ground water back into the aquifer by means of recharge wells or by infiltration trenches placed on-site, not injection wells. The impacts, if any, from fouling from iron forming bacterias, clogging from particulates, and recharging on ground water flow patterns will be evaluated during the remedial design. The unexpected movement of chemicals in ground water due to change in hydraulic gradient will also be evaluated during the remedial design. Recharging utilizing storm sewers and/or recharge basins will be evaluated during the remedial design, as necessary.

COMMENT:

10. Based on our review of site conditions and RI/FS data, ERM-Northeast believes that sparging would offer significant advantages over the proposed ground water remediation system.

Soil remediation goals proposed in the "Plan" is based on the ability of removing VOC's from the unsaturated soil zone. ERM-Northeast concurs that soil vapor vacuum extraction would meet the remediation goal of removing VOC's from soil. ERM-Northeast questions the need for soil flushing to remediate site soils.

The combination of sparging and soil vacuum extraction, which was not evaluated in the FS, appears to be the best suited combination of remedial technologies to environmentally and cost effectively remediate the Pasley Solvents and Chemicals Site.

EPA'S  
RESPONSE:

Sparging was not included in the FS because this technology would require the excavation of a significant amount of soils in order to place a sparging system in the aquifer. There would be an added risk associated with dust generated during excavation. In addition, EPA believes that sparging would be ineffective in remediating the aquifer and would have potential disadvantages due to the RCRA Land Disposal Restriction because of the excavation that is involved. In addition, sparging has only been used on a limited basis at Superfund sites; however, it is being used to treat underground gasoline tank spills throughout the United States.

As outlined in the ROD, soil flushing which was proposed to remediate semi-volatile compounds may not be necessary. This is due to the fact that the circulation of air through the soil as part of the vacuuming procedure would enhance the biodegradation of the semi-volatiles in the soil. Soil vacuuming would be performed initially to remove the volatile and semi-volatile compounds. A soil sampling and analysis program would then be implemented to evaluate the success of the soil vacuuming. Soil flushing, used to flush any remaining water-soluble contaminants from the soil, would be performed after soil vacuuming to achieve soil cleanup goals. However, if it is found after the soil vacuuming that concentrations of semi-volatile compounds are decreasing in the soil and are not impacting ground water, the soil flushing technique may be eliminated.

COMMENT:

11. ERM-Northeast concurs that remediation goals must take into account upgradient contamination sources, i.e., Roosevelt Field plume. Current background contaminant levels will likely increase over time until remediation efforts on the Roosevelt Field plume and other upgradient sources are implemented. Given that this effort is likely many years from now, ground water cleanup goals should take into account what future background concentrations will be.

EPA'S  
RESPONSE:

EPA did take into account the upgradient contamination. As described in the ROD, sampling will be performed over time to evaluate the progress of the remediation. In addition, specific remedial action objectives for the ground water at the Site include:

Restoration of ground water quality to its intended use (Class IIb and GA-potential of drinking water) by reducing contaminant levels below State and Federal drinking water standards where possible (see Table 2-2 FS Report). In the case where upgradient concentrations prohibit such restoration for a particular compound, the contaminant level will be reduced to the upgradient level.

**SECTION 3.0, SECONDARY ISSUES**

In addition to the comments summarized in the Executive Summary on the FS, there were some "secondary issues" raised on the FS by ERM. These secondary issues, ERM acknowledged, do not affect the primary conclusions reached in the FS. These secondary issues are summarized and are addressed below briefly .

1. Compliance with 1990 NCP.
2. RA Reference.
3. RCRA Issues
4. Technology Evaluation
5. CERCLA and Permits Requirements
6. State and Community Acceptance.

1. Any references made to the 1985 NCP were corrected in the FS report, dated February, 1992.

2. The Risk Assessment (RA) was referenced in the FS report, dated February, 1992.

3. RCRA requirements, including Land Disposal Restrictions (LDRs) would apply to any soil excavation measures selected for the Site.

However, since the selected remedial action does not involve excavation, LDRs are not applicable. The FS was revised to addresses RCRA listed wastes.

4. In the FS report, dated February, 1992, on-site incineration was screened from further evaluation. The FS did eliminate soil washing technology because of higher costs in comparison with soil flushing technology. However, cost was only used as a secondary issue. The primary reason that soil washing was eliminated was that an additional risk would be introduced because of the excavation that is involved. The soil flushing technology would not involve any excavation of the soil.

5. Items No. 3 and 5 were deleted from the FS, as appropriate. On Page 2-3 of the FS, dated February, 1992, permit requirements with respect to CERCLA are adequately discussed.

6. Assessment of State Acceptance was not completed until the comments on the RI/FS and the Proposed Plan were received from the State. Likewise, the Assessment of Community Acceptance was not completed until the comments on the Proposed Plan were received.

#### SECTION 4.0

This section of the ERM submittal is a review of the EPA's Proposed Plan, dated February, 1992. ERM acknowledged in this Section, that most of the issues identified in its review of the FS were addressed in the Proposed Plan. The following is a summary of ERM's review and EPA's responses; as necessary.

#### Remediation Goals

EPA notes that ERM concurred with EPA on the use of Federal and State MCLs and upgradient concentrations as cleanup levels for ground water beneath and downgradient of the Site. In addition, ERM also concurred with EPA that a technical waiver of ground water ARARs is a practical scenario.

#### Ground Water Remediation

ERM believes that a sparging and vacuum extraction system may offer significant advantages over the EPA's proposed ground water remediation system. However, as EPA outlined in the response to Question 10, above, sparging was not included in the FS because this technology would require the excavation of a significant amount of soils in order to place a sparging system in the aquifer. There would be an added risk associated with excavation.

In response to the three (3) advantages listed for sparging versus the proposed ground water treatment and recharge, ERM's comments and EPA's responses are as follows:

Comment:

1. Sparging would not draw in ground water to the area beneath the Site from aquifers beneath adjacent sites which presently contain chemicals of concern above drinking water standards.

Response:

EPA is required by the NCP to restore ground water to its beneficial uses. This requires that the extent of a ground water contaminant plume be remediated. EPA believes that sparging would be ineffective in remediating the plume.

Comment:

2. Sparging would not require the proposed metals removal treatment to protect organics removal treatment units. As a result, metals removal sludge would not be generated. This would eliminate the potential problems associated with sludge generation, including handling, transportation, off-site treatment and disposal and testing requirements.

Response:

The metal removal treatment was proposed because chromium concentrations were detected in excess of the Federal and State ground water MCLs. However, as outlined in EPA's response to Question 3, above, during the periodic sampling and analyses of the influent, if it is determined that metals concentrations are below standards and low enough not to cause malfunction of the air stripper, the metals precipitation portion of the treatment train may be eliminated.

Comment:

3. Sparging typically achieves ground water remediation in a significantly shorter time than the time period required by conventional pump and treat systems. This could reduce the 10 to 40 year time period estimated in the FS to be needed for ground water remediation if the proposed extraction system is used.

Response:

Air sparging is classified as an innovative technology because it lacks well documented cost and performance data under a variety of operating conditions. Air sparging has only been used on a limited basis at Superfund sites; however, it is being used to treat underground gasoline tank spills throughout the United States. Therefore, the statement that air sparging would take a significantly shorter period of time



than the time period required for the proposed pump and treat system has not been proven. In addition, as outlined in EPA's response to Question 9, above, with the soil remediation that is proposed, the ground water treatment time period should be reduced because the contaminated soil, which is the major source of contamination to the ground water aquifer, will be removed.

#### Ground Water Extraction

Overall, ERM concurred with the EPA on the conceptual design of the ground water extraction system as outlined in the proposed plan, dated February, 1992. This statement was made with the understanding that ground water sparging may replace the extraction, treatment and recharge ground water system proposed.

#### Ground Water Treatment

ERM concurred that a metals removal system is needed, primarily to prevent interference with the VOC removal system. ERM also concurred with the EPA selection of air stripping for remediating ground water. EPA notes that the need for air emission controls of the air stripping unit will be further refined and reviewed during the remedial design. As stated in the ROD, page 18, the granulated activated carbon polishing step would be used, as necessary, to remove any remaining organic compounds in order to achieve ARARs.

#### Ground Water Recharge

As outlined in EPA's response to Question 9, above, the unexpected movement of chemicals in ground water due to the change in hydraulic gradient and the clogging of recharge wells over time will be addressed during the remedial design.

#### Soil Remediation

ERM concurred with EPA that soil vacuuming measures that were proposed provide the best balance of trade-offs among the soil remediation alternatives evaluated in the FS with respect to the evaluation criteria. However, there were two issues related to the soil remediation that ERM believed should be modified or clarified. The two issues and EPA's response follows:

1. Need for soil flushing

As outlined on page 26 of the ROD and EPA's response to Question 10, above, soil flushing which was proposed to remediate semi-volatile compounds may not be necessary. This is due to the fact that the circulation of air through the soil as part of the vacuuming procedure would enhance the biodegradation of the semi-volatiles in the soil. Soil vacuuming would be performed initially to remove the volatile

and semi-volatile compounds. A soil sampling and analysis program would then be implemented to evaluate the success of the soil vacuuming. Soil flushing, used to flush any remaining water-soluble contaminants from the soil, would be performed after soil vacuuming to achieve soil cleanup goals. However, if it is found after the soil vacuuming that concentrations of semi-volatile compounds are decreasing in the soil and are not impacting ground water, the soil flushing technique may be eliminated.

2. Need for semi-annual soil sampling for thirty years.

The Proposed Plan did not specify that the proposed soil remediation alternative would require semi-annual soil sampling for thirty years. As outlined in the Proposed Plan, and the ROD, periodic subsurface soil sampling and analysis would be required to monitor the progress of both processes. The soil sampling program will be evaluated as part of the remedial design. Further, the time for completion of the soil remedial action was estimated to be approximately six (6) years.

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**APPENDIX 5**

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Page: 1

Document Number: PAI-001-0001 To 0112

Date: 08/30/88

Title: Final Field Operations Plan for Remedial Investigation/Feasibility Study - Pasley Solvents  
and Chemicals Site, Town of Hempstead, Long Island NY

Type: PLAN

Author: Blonar, Edward W: ICF Technology

Recipient: none: US EPA

Document Number: PAI-001-0113 To 0275

Date: 08/30/88

Title: Final Work Plan for Remedial Investigation/Feasibility Study - Pasley Solvents and Chemicals  
Site, Town of Hempstead, Long Island NY

Type: PLAN

Author: Blonar, Edward W: ICF Technology

Recipient: none: US EPA

Document Number: PAI-001-0276 To 0341

Date: 09/01/88

Title: Final Work Plan for Tank Demolition and Removal at the Pasley Solvents and Chemicals Site,  
Town of Hempstead, Long Island NY

Type: PLAN

Author: Russell, William G: EA Engineering Science & Technology

Recipient: none: Commander Oil Corporation

Document Number: PAI-001-0342 To 0616

Date: 03/01/89

Title: Soil Vapor Contaminant Assessment for Remedial Investigation/Feasibility Study - Pasley Solvents  
and Chemicals Site, Town of Hempstead, Long Island NY

Type: PLAN

Author: Schultz, James A: EA Engineering Science & Technology

Recipient: none: Commander Oil Corporation

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Document Number: PAI-001-0617 To 0762

Date: 10/01/91

Title: Remedial Investigation Report - Pasley Solvents & Chemicals Site, Town of Hempstead, Long Island NY

Type: REPORT

Author: none: Metcalf & Eddy

Recipient: none: Commander Oil Corporation

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Document Number: PAI-001-0763 To 0783

Date: 11/08/90

Title: (Letter forwarding attached EPA comments on the Draft Remedial Investigation Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-0784 To 1009

Date: 03/14/91

Title: (Letter forwarding data, received from the Nassau County Department of Public Works for the Mitchel Field site, to be incorporated into the Pasley Remedial Investigation Report, and transmitting attached Monitoring Program Sampling Report)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-1010 To 1013

Date: 03/21/91

Title: (Letter forwarding attached analytical results of groundwater samples from existing wells at the former Texaco service station, Garden City NY)

Type: CORRESPONDENCE

Author: Brooker, Lauren J: Star Enterprise

Recipient: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

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Document Number: PAI-001-1014 To 1017

Date: 05/30/91

Title: (Letter forwarding attached comments from EPA about Metcalf & Eddy's Remedial Investigation Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

Document Number: PAI-001-1018 To 1018

Date: 07/19/91

Title: (Letter requesting information about any hazardous waste site located near Stewart Avenue which may be upgradient of the Pasley Solvents & Chemicals site)

Type: CORRESPONDENCE

Author: Henry, Sherrel D: US EPA

Recipient: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

Document Number: PAI-001-1019 To 1031

Date: 10/04/91

Title: (Letter forwarding attached EPA comments on the third revision of the June 1991 Remedial Investigation Report)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

Document Number: PAI-001-1032 To 1032

Date: 12/05/91

Title: (Letter approving the revised Remedial Investigation Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-1033 To 1326

Date: 02/01/92

Title: Feasibility Study Report - Pasley Solvents and Chemicals Site, Town of Hempstead, Nassau County  
NY

Type: REPORT  
Author: Roth, Robert J: Metcalf & Eddy  
Recipient: none: US EPA

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Document Number: PAI-001-1327 To 1346

Date: 02/01/92

Title: Superfund Proposed Plan - Pasley Solvents and Chemicals Site, Town of Hempstead NY

Type: PLAN  
Author: none: US EPA  
Recipient: none: none

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Document Number: PAI-001-1347 To 1357

Date: 10/24/91

Title: (Letter forwarding attached EPA comments on the Draft Feasibility Study Report for the site)

Type: CORRESPONDENCE  
Author: Petersen, Carole: US EPA  
Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-1358 To 1360

Date: 12/18/91

Title: (Letter forwarding attached comments on the Feasibility Study Report for the site)

Type: CORRESPONDENCE  
Author: Petersen, Carole: US EPA  
Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-1361 To 1362

Date: 12/27/91

Title: (Letter containing NYSDEC and NYSDOH comments on the EPA Proposed Plan for the site)

Type: CORRESPONDENCE  
Author: O'Toole, Michael J Jr: NY Dept of Environmental Conservation  
Recipient: Hauptman, Mel: US EPA

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Document Number: PAI-001-1363 To 1364

Date: 05/31/91

Title: (Letter stating what has to be done to stop the dissolved product plume from moving onto the property of the Texaco service station)

Type: CORRESPONDENCE

Author: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

Recipient: Brooker, Lauren J: Star Enterprise

Document Number: PAI-001-1365 To 1366

Date: 06/17/91

Title: (Letter containing response to NYSDEC correspondence regarding the former Texaco service station at the site)

Type: CORRESPONDENCE

Author: Brooker, Lauren J: Star Enterprise

Recipient: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

Document Number: PAI-001-1367 To 1384

Date: 08/19/88

Title: Administrative Order on Consent in the Matter of Commander Oil Corporation

Type: LEGAL DOCUMENT

Author: Muszynski, William J: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

Document Number: PAI-001-1385 To 1385

Date: 07/11/91

Title: (Letter regarding the Mitchel Field facility that Purex has constructed pursuant to a consent judgment)

Type: CORRESPONDENCE

Author: Smith, Jeffrey M: Purex Industries Inc

Recipient: Henry, Sherrel D: US EPA

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Document Number: PAI-001-1386 To 1395

Date: 05/01/91

Title: Engineering Bulletin: In Situ Soil Vapor Extraction Treatment

Type: CORRESPONDENCE

Author: none: US EPA

Recipient: none: none

-----  
Document Number: PAI-001-1396 To 1437

Date: 03/10/92

Title: (Transcript of the 03/05/92 Public Meeting for the Pasley Solvents & Chemicals site)

Type: LEGAL DOCUMENT

Author: Lewis, Virginia E: court reporter

Recipient: none: US EPA  
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Document Number: PAI-001-1367 To 1384

Date: 08/19/88

Title: Administrative Order on Consent in the Matter of Commander Oil Corporation

Type: LEGAL DOCUMENT

Author: Muszynski, William J: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

Document Number: PAI-001-0001 To 0112

Date: 08/30/88

Title: Final Field Operations Plan for Remedial Investigation/Feasibility Study - Pasley Solvents and Chemicals Site, Town of Hempstead, Long Island NY

Type: PLAN

Author: Blonar, Edward W: ICF Technology

Recipient: none: US EPA

Document Number: PAI-001-0113 To 0275

Date: 08/30/88

Title: Final Work Plan for Remedial Investigation/Feasibility Study - Pasley Solvents and Chemicals Site, Town of Hempstead, Long Island NY

Type: PLAN

Author: Blonar, Edward W: ICF Technology

Recipient: none: US EPA

Document Number: PAI-001-0276 To 0341

Date: 09/01/88

Title: Final Work Plan for Tank Demolition and Removal at the Pasley Solvents and Chemicals Site, Town of Hempstead, Long Island NY

Type: PLAN

Author: Russell, William G: EA Engineering Science & Technology

Recipient: none: Commander Oil Corporation

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Document Number: PAI-001-0342 To 0616

Date: 03/01/89

Title: Soil Vapor Contaminant Assessment for Remedial Investigation/Feasibility Study - Pasley Solvents and Chemicals Site, Town of Hempstead, Long Island NY

Type: PLAN

Author: Schultz, James A: EA Engineering Science & Technology

Recipient: none: Commander Oil Corporation

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Document Number: PAI-001-0763 To 0783

Date: 11/08/90

Title: (Letter forwarding attached EPA comments on the Draft Remedial Investigation Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

-----  
Document Number: PAI-001-0784 To 1009

Date: 03/14/91

Title: (Letter forwarding data, received from the Nassau County Department of Public Works for the Mitchel Field site, to be incorporated into the Pasley Remedial Investigation Report, and transmitting attached Monitoring Program Sampling Report)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

-----  
Document Number: PAI-001-1010 To 1013

Date: 03/21/91

Title: (Letter forwarding attached analytical results of groundwater samples from existing wells at the former Texaco service station, Garden City NY)

Type: CORRESPONDENCE

Author: Brooker, Lauren J: Star Enterprise

Recipient: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

PAI 001 1052

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Document Number: PAI-001-1386 To 1395

Date: 05/01/91

Title: Engineering Bulletin: In Situ Soil Vapor Extraction Treatment

Type: CORRESPONDENCE

Author: none: US EPA

Recipient: none: none

-----  
Document Number: PAI-001-1014 To 1017

Date: 05/30/91

Title: (Letter forwarding attached comments from EPA about Metcalf & Eddy's Remedial Investigation Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph B: Commander Oil Corporation

-----  
Document Number: PAI-001-1363 To 1364

Date: 05/31/91

Title: (Letter stating what has to be done to stop the dissolved product plume from moving onto the property of the Texaco service station)

Type: CORRESPONDENCE

Author: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

Recipient: Brooker, Lauren J: Star Enterprise

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Document Number: PAI-001-1365 To 1366

Date: 06/17/91

Title: (Letter containing response to NYSDEC correspondence regarding the former Texaco service station at the site)

Type: CORRESPONDENCE

Author: Brooker, Lauren J: Star Enterprise

Recipient: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

PAI 001 1500

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Document Number: PAI-001-1385 To 1385

Date: 07/11/91

Title: (Letter regarding the Mitchel Field facility that Purex has constructed pursuant to a consent judgment)

Type: CORRESPONDENCE

Author: Smith, Jeffrey M: Purex Industries Inc

Recipient: Henry, Sherrel D: US EPA

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Document Number: PAI-001-1818 To 1818

Date: 07/19/91

Title: (Letter requesting information about any hazardous waste site located near Stewart Avenue which may be upgradient of the Pasley Solvents & Chemicals site)

Type: CORRESPONDENCE

Author: Henry, Sherrel D: US EPA

Recipient: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

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Document Number: PAI-001-0617 To 0762

Date: 10/01/91

Title: Remedial Investigation Report - Pasley Solvents & Chemicals Site, Town of Hempstead, Long Island NY

Type: REPORT

Author: none: Metcalf & Eddy

Recipient: none: Commander Oil Corporation

-----  
Document Number: PAI-001-1819 To 1831

Date: 10/04/91

Title: (Letter forwarding attached EPA comments on the third revision of the June 1991 Remedial Investigation Report)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-1347 To 1357

Date: 10/24/91

Title: (Letter forwarding attached EPA comments on the Draft Feasibility Study Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-1832 To 1832

Date: 12/05/91

Title: (Letter approving the revised Remedial Investigation Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-1358 To 1360

Date: 12/18/91

Title: (Letter forwarding attached comments on the Feasibility Study Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-1361 To 1362

Date: 12/27/91

Title: (Letter containing NYSDEC and NYSDOH comments on the EPA Proposed Plan for the site)

Type: CORRESPONDENCE

Author: O'Toole, Michael J Jr: NY Dept of Environmental Conservation

Recipient: Hauptman, Mel: US EPA

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Document Number: PAI-001-1033 To 1326

Date: 02/01/92

Title: Feasibility Study Report - Pasley Solvents and Chemicals Site, Town of Hempstead, Nassau County  
NY

Type: REPORT

Author: Roth, Robert J: Metcalf & Eddy

Recipient: none: US EPA

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Document Number: PAI-001-1327 To 1346

Date: 02/01/92

Title: Superfund Proposed Plan - Pasley Solvents and Chemicals Site, Town of Hempstead NY

Type: PLAN

Author: none: US EPA

Recipient: none: none

-----  
Document Number: PAI-001-1396 To 1437

Date: 03/10/92

Title: (Transcript of the 03/05/92 Public Meeting for the Pasley Solvents & Chemicals site)

Type: LEGAL DOCUMENT

Author: Lewis, Virginia E: court reporter

Recipient: none: US EPA  
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Document Number: PAI-001-0617 To 0762

Date: 10/01/91

Title: Remedial Investigation Report - Pasley Solvents & Chemicals Site, Town of Hempstead, Long Island NY

Type: REPORT

Author: none: Metcalf & Eddy

Recipient: none: Commander Oil Corporation

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Document Number: PAI-001-1327 To 1346

Date: 02/01/92

Title: Superfund Proposed Plan - Pasley Solvents and Chemicals Site, Town of Hempstead NY

Type: PLAN

Author: none: US EPA

Recipient: none: none

-----  
Document Number: PAI-001-1386 To 1395

Date: 05/01/91

Title: Engineering Bulletin: In Situ Soil Vapor Extraction Treatment

Type: CORRESPONDENCE

Author: none: US EPA

Recipient: none: none

-----  
Document Number: PAI-001-0001 To 0112

Date: 08/30/88

Title: Final Field Operations Plan for Remedial Investigation/Feasibility Study - Pasley Solvents and Chemicals Site, Town of Hempstead, Long Island NY

Type: PLAN

Author: Blamar, Edward W: ICF Technology

Recipient: none: US EPA

-----  
Document Number: PAI-001-0113 To 0275

Date: 08/30/88

Title: Final Work Plan for Remedial Investigation/Feasibility Study - Pasley Solvents and Chemicals Site, Town of Hempstead, Long Island NY

Type: PLAN

Author: Blamar, Edward W: ICF Technology

Recipient: none: US EPA

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Document Number: PAI-001-1010 To 1013

Date: 03/21/91

Title: (Letter forwarding attached analytical results of groundwater samples from existing wells at the former Texaco service station, Garden City NY)

Type: CORRESPONDENCE

Author: Brooker, Lauren J: Star Enterprise

Recipient: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

Document Number: PAI-001-1365 To 1366

Date: 06/17/91

Title: (Letter containing response to NYSDEC correspondence regarding the former Texaco service station at the site)

Type: CORRESPONDENCE

Author: Brooker, Lauren J: Star Enterprise

Recipient: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

Document Number: PAI-001-1010 To 1010

Date: 07/19/91

Title: (Letter requesting information about any hazardous waste site located near Stewart Avenue which may be upgradient of the Pasley Solvents & Chemicals site)

Type: CORRESPONDENCE

Author: Henry, Sherrel D: US EPA

Recipient: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

Document Number: PAI-001-1396 To 1437

Date: 03/10/92

Title: (Transcript of the 03/05/92 Public Meeting for the Pasley Solvents & Chemicals site)

Type: LEGAL DOCUMENT

Author: Lewis, Virginia E: court reporter

Recipient: none: US EPA

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Document Number: PAI-001-1363 To 1364

Date: 05/31/91

Title: (Letter stating what has to be done to stop the dissolved product plume from moving onto the property of the Texaco service station)

Type: CORRESPONDENCE

Author: Mirza, Misbahuddin K: NY Dept of Environmental Conservation

Recipient: Brooker, Lauren J: Star Enterprise

Document Number: PAI-001-1367 To 1384

Date: 08/19/88

Title: Administrative Order on Consent in the Matter of Commander Oil Corporation

Type: LEGAL DOCUMENT

Author: Muszynski, William J: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

Document Number: PAI-001-1361 To 1362

Date: 12/27/91

Title: (Letter containing NYSDEC and NYSDOH comments on the EPA Proposed Plan for the site)

Type: CORRESPONDENCE

Author: O'Toole, Michael J Jr: NY Dept of Environmental Conservation

Recipient: Hauptman, Mel: US EPA

Document Number: PAI-001-0763 To 0783

Date: 11/08/90

Title: (Letter forwarding attached EPA comments on the Draft Remedial Investigation Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

Document Number: PAI-001-0784 To 1009

Date: 03/14/91

Title: (Letter forwarding data, received from the Nassau County Department of Public Works for the Mitchel Field site, to be incorporated into the Pasley Remedial Investigation Report, and transmitting attached Monitoring Program Sampling Report)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-1014 To 1017

Date: 05/30/91

Title: (Letter forwarding attached comments from EPA about Metcalf & Eddy's Remedial Investigation Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-1019 To 1031

Date: 10/04/91

Title: (Letter forwarding attached EPA comments on the third revision of the June 1991 Remedial Investigation Report)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

-----

Document Number: PAI-001-1032 To 1032

Date: 12/05/91

Title: (Letter approving the revised Remedial Investigation Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

-----

Document Number: PAI-001-1347 To 1357

Date: 10/24/91

Title: (Letter forwarding attached EPA comments on the Draft Feasibility Study Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

-----

Document Number: PAI-001-1358 To 1360

Date: 12/18/91

Title: (Letter forwarding attached comments on the Feasibility Study Report for the site)

Type: CORRESPONDENCE

Author: Petersen, Carole: US EPA

Recipient: Shapiro, Joseph G: Commander Oil Corporation

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Document Number: PAI-001-1033 To 1326

Date: 02/01/92

Title: Feasibility Study Report - Pasley Solvents and Chemicals Site, Town of Hempstead, Nassau County  
NY

Type: REPORT

Author: Roth, Robert J: Metcalf & Eddy

Recipient: none: US EPA

-----

Document Number: PAI-001-0276 To 0341

Date: 09/01/88

Title: Final Work Plan for Tank Demolition and Removal at the Pasley Solvents and Chemicals Site,  
Town of Hempstead, Long Island NY

Type: PLAN

Author: Russell, William G: EA Engineering Science & Technology

Recipient: none: Commander Oil Corporation

-----

Document Number: PAI-001-0342 To 0616

Date: 03/01/89

Title: Soil Vapor Contaminant Assessment for Remedial Investigation/Feasibility Study - Pasley Solvents  
and Chemicals Site, Town of Hempstead, Long Island NY

Type: PLAN

Author: Schultz, James A: EA Engineering Science & Technology

Recipient: none: Commander Oil Corporation

-----

Document Number: PAI-001-1385 To 1385

Date: 07/11/91

Title: (Letter regarding the Mitchel Field facility that Purex has constructed pursuant to a consent  
judgment)

Type: CORRESPONDENCE

Author: Smith, Jeffrey M: Purex Industries Inc

Recipient: Henry, Sherrel D: US EPA

PAI 001 1561

600124

PL 99-499, October 17, 1986 (SARA), and administered by EPA, governs the liability, cleanup, and emergency response for hazardous substances released into the environment. Section 104 of CERCLA authorizes the President of the United States to arrange for the removal of and provide remedial action or other response measures necessary to protect the public health, welfare or the environment against actual or threatened releases of hazardous substances. Section 106 of CERCLA authorizes the President of the United States to secure relief to abate any imminent or substantial endangerment to public health or welfare or the environment. Section 105 of CERCLA sets the stage for the establishment of a National Contingency Plan (NCP). All remedial actions must be consistent with the NCP.

#### 2.1.1.1 National Contingency Plan (NCP) Requirements

The development and evaluation of remedial alternatives proceeds in three phases, as outlined in the current NCP. New York State does not have a separate state contingency plan and follows the national requirements. The NCP phases are:

1. The number and type of alternative shall be determined at each site, taking into account the scope, characteristics, and complexity [40 CFR Part 300.430(e)(2)].
2. Initially screen alternatives, when needed, to narrow list of potential remedial actions requiring detailed analysis [40 CFR Part 300.430 (e)(2)].
3. Conduct detailed evaluation of alternatives remaining after initial screening [40 CFR Part 300.430 (e)(9)].

#### 2.1.1.2 Permit Exceptions

Section 121(e) of the Superfund Amendments and Reauthorization Act addresses permit requirements for removal and remedial actions as follows:

"(e) Permits and Enforcement. No Federal, State or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action is selected and carried out in compliance with this section."

Section 121 refers solely to EPA-financed and approved actions. Since the Pasley site is on the NPL, this section is applicable.

#### 2.1.1.3 Community Relations

CERCLA requires public involvement during the FS process. Community Relations Plans (CRPs) must be developed by the lead agency prior to initiation of remedial activities and implemented during the course of the action(s) [CRP, 40 CFR 300.430(c)(ii)]. Information on developing a CRP and other public involvement guidance is provided by EPA in "Community Relations in Superfund: A Handbook". This handbook specifies that the community relations plan must include:

- . The background and history of community involvement (site history; local activity and interest; and key community issues);
- . A list of affected and interested groups and individuals; their affiliations, addresses and telephone numbers;
- . Site-specific objectives for the community relations program;
- . A budget, schedule and work plan;
- . A list of communication activities to be conducted at the site, an explanation of how these activities will be conducted, and a description of how these activities relate to the technical response schedule; and
- . A list of technical and community relations staff responsible for site work.

#### 2.1.2 RCRA Subtitle C/HSWA/New York Hazardous Waste Rules

Resource Conservation and Recovery Act (RCRA) regulations (40 CFR Parts 260 through 280), set forth under Subtitle C of the Solid Waste Disposal Act, pertain to the overall management of hazardous wastes by the Federal government. RCRA sets forth criteria for identifying hazardous substances and lists those under its jurisdiction. It also specifies technical standards and administrative requirements that must be met by hazardous waste generators, transporters, and owners and operators of hazardous waste treatment, storage, disposal and recycling facilities. The Hazardous and Solid Waste Amendments (HSWA) of 1984 imposed new requirements for the safe management of hazardous wastes.

Section 300.415 of the NCP states that when off-site action is taken in connection with a removal action, the facility used for the off-site management must be in compliance with Subtitle C of RCRA. Procedures for

implementing these provisions are established in EPA's "Procedures for Planning and Implementing CERCLA Off-site Response Actions" (May 6, 1985), in SARA Section 121 (CERCLA Section 121(a)-(d)), and supported by EPA RI/FS Guidance documents. Specific limitations state that:

- . All hazardous substances which are RCRA hazardous waste transported off-site must be taken to a hazardous waste management facility holding either an applicable RCRA permit or an applicable interim status permit;
- . Waste samples used in small scale treatability studies are conditionally exempted from RCRA subtitle C provisions (50 FR 27290, July 19, 1988);
- . The off-site storage, treatment, and disposal of hazardous substances must be cost-effective in comparison to other protective response actions; and
- . A RCRA compliance inspection must be performed at any hazardous waste management facility before it can receive hazardous substances from a CERCLA-funded response. The inspection must demonstrate that the facility has no significant violations.

A waste is hazardous if it meets the characteristics of ignitability, corrosivity, reactivity or toxicity by way of the Toxicity Characteristic Leaching Procedure (TCLP) test, or if it is specifically listed as hazardous (40 CFR 261, Subpart C). The TCLP expands the characteristic to include 38 additional organic constituents and apply compound-specific dilution/attenuation factors for organic constituents (55 FR 31387, Aug. 1990).

According to the tank inventory listed in Table 1.1, a number of RCRA listed materials were stored on the site. These materials, such as TCE, are also found in soil and groundwater at the site. In accordance with the RCRA derived from rule, soil and groundwater containing these materials present as a result of spills or leaks would also be considered a RCRA hazardous waste if moved or treated.

The TCLP (40 CFR 261.24) has been used to identify wastes with the potential to produce leachate containing significant concentrations of toxicants. Wastes are considered hazardous if their EP test leachate concentrations exceed the regulatory levels specified.

#### 2.1.2.1 Site Security

RCRA site security requirements of 40 CFR 264.14 are applicable to the Pasley site actions.

#### 2.1.2.2 RCRA Waste Generation

RCRA generator requirements of 40 CFR 262 are applicable if during the course of implementing remedial actions, the waste is disturbed. When the waste is disturbed or moved, the owner/operator is then considered a generator of hazardous waste.

#### 2.1.2.3 Transportation

RCRA transportation requirements of 40 CFR 263 are applicable to all remedial actions that include the transport of waste off-site.

#### 2.1.2.4 Closure, Post-Closure, Groundwater Protection and Monitoring

General RCRA regulations applicable to any proposed remedial alternative at the Pasley site include, at a minimum, closure and post-closure requirements under 40 CFR 264 Subpart G (Sections 264.111, 264.114, 264.117, 264.119, and 264.120). Under RCRA, groundwater monitoring requirements are specified under 40 CFR 264 Subpart F. The EPA Regional Administrator specifies hazardous constituents to monitor for, the point of compliance, and the groundwater concentration limits at the site.

#### 2.1.2.5 Other Potentially Applicable RCRA Regulations

Depending upon the proposed remedial alternative, certain subparts of RCRA 40 CFR 264 and 265 may become applicable\*:

- Subpart I - Use and Management of Containers
- Subpart J - Tanks Systems
- Subpart L - Waste Piles
- Subpart O - Incinerators
- Subpart P - Thermal Treatment

\*Note: Part 264 of 40 CFR specifically regulates licensed TSDFs while Part 265 specifies regulations for interim status TSDFs.



TABLE 2-2 POTENTIAL ARARS FOR GROUNDWATER CONTAMINANTS  
PASLEY SOLVENTS AND CHEMICAL SITE

				ARARS			GOAL TO BE CONSIDERED							
	MAXIMUM	MOST STRINGENT ARAR	MOST	FEDERAL	NY	DRINKING	FEDERAL	PROPOSED	NY AMBIENT	EPA DRINKING	REFERENCE			
	CONCENTRATION		STRINGENT		GOAL			WATER	FEDERAL	FEDERAL		WATER	WATER	CONCENTRATION
	DETECTED		TO BE		SDWA			SDWA	WATER	WATER		HEALTH	EPA AWQC	FOR POTENTIAL
	IN ON-SITE		CONSIDERED		MCL			QUALITY	MCLs	GUIDANCE		ADVISORIES	DW ONLY	CARCINOGENS
	WELLS 2S & 2I			(a)	STANDARDS (b)	(c)	(d)	(d)	VALUES (b)	(e)	(f)	(g)		
VOLATILE ORGANICS COMPOUNDS				ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l		
Methylene Chloride	16J	5	0	NS	NS	5	0P	5	NS	NS	0(0.19)	4.7		
Benzene	43J	0.7	0	5	0.7(h)	5	0	NS	NS	NS	0(0.67)	1.2		
Acetone	3800J	50	NS	NS	NS	50	NS	NS	50G	NS	NS	NS		
Chloroform	74J	7	0	100(i)	NS	10	NS	NS	NS	NS	0(0.19)	5.7		
1,1-Dichloroethene	84J	5	0	7	NS	5	7	NS	NS	NS	0(0.33)	.06		
1,1-Dichloroethane	630	5	NS	NS	NS	5	NS	NS	NS	NS	NS	NS		
Trans-1,2-Dichloroethene	37,000	5	100	100	NS	5	100	NS	NS	350	NS	NS		
Ethylbenzene	510	5	700	700	NS	5	700	NS	NS	3,400	2400	NS		
Tetrachloroethene	160J	5	0	5	NS	5	0	NS	NS	NS	0(0.88)	.7		
Toluene	1100	5	1000	1000	NS	5	1000	NS	NS	10,800	15,000	NS		
Trichloroethene	320	5	0	5	NS	5	0	NS	NS	NS	0(2.8)	3.2		
1,1,1-Trichloroethane	3600	5	200	200	NS	5	200	NS	NS	1,000	19,000	NS		
Chlorobenzene	510	5	100	100	NS	5	100	NS	NS	3,150	488	NS		
Xylene (Total)	817.3	5	2,200	10,000	NS	5	10,000	NS	NS	2,200	NS	NS		
SEMI-VOLATILE ORGANIC COMPOUNDS														
di-n-butyl phthalate	40	50	44,000	NS	50	50	NS	NS	50G(h)	NS	44,000	NS		
2-Methylnaphthalene	110	50	NS	NS	NS	50	NS	NS	50G	NS	NS	NS		
Naphthalene	270	50	NS	NS	NS	50	NS	NS	10G(h)	NS	NS	NS		
Dibenzofuran	5J	50	NS	NS	NS	50	NS	NS	50G	NS	NS	NS		
Phenanthrene	5J	50	NS	NS	NS	50	NS	NS	50G(h)	NS	NS	NS		
di-n-Octyl phthalate	2J	50	NS	NS	NS	50	NS	NS	50G(h)	NS	NS	NS		
Acenaphthylene	21	50	NS	NS	NS	50	NS	NS	50G	NS	NS	NS		
Acenaphthene	7J	50	20	NS	NS	50	NS	NS	20G(h)	NS	20	NS		
Fluorene	7J	50	NS	NS	NS	50	NS	NS	50G(h)	NS	NS	NS		
Bis(2-ethylhexyl)phthalate	40	50	2.5	NS	50	50	NS	NS	50G	NS	NS	2.5		

3001 100 100

TABLE 2-2 Cont'd. POTENTIAL ARARS FOR GROUNDWATER CONTAMINANTS  
PASLEY SOLVENTS AND CHEMICAL SITE

				ARARS			GOAL TO BE CONSIDERED					
	MAXIMUM	MOST STRINGENT ARAR	MOST STRINGENT GOAL TO BE CONSIDERED	FEDERAL	NY	DRINKING	FEDERAL	PROPOSED	NY AMBIENT	EPA DRINKING	REFERENCE	
	CONCENTRATION			SDWA	WATER	WATER	SDWA	FEDERAL	WATER	WATER	CONCENTRATION	
	DETECTED IN ON-SITE WELLS 2B & 2I			MCL (a)	QUALITY STANDARDS (b)	MCLs (c)	MCLs (d)	MCL (d)	QUALITY GUIDANCE VALUES (b)	HEALTH ADVISORIES (e)	EPA AWQC DW ONLY (f)	FOR POTENTIAL CARCINOGENS (g)
METALS	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Aluminum	97,400	NS	50	NS	NS	NS	50-200(k)	NS	NS	NS	NS	NS
Antimony	39.9	10/5P(m)	3	10/5P(m)	NS	NS	3P	10/5(m)	NS	NS	146	NS
Arsenic	-	25	20	50	25	50	50P	NS	NS	50	(25 ng/l)	20
Barium	372	1,000	1,800	2,000	1,000	1,000	5,000P	NS	NS	1,800	NS	NS
Beryllium	6.6	1P	0	1P	NS	NS	0P	1	NS	NS	(3.9 ng/l)	.008
Cadmium	4.5	5	5	5	10	10	5	NS	NS	18	10	NS
Calcium	36,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	255	50	50	100	50	50	100	NS	NS	170	50	NS
Cobalt	45.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Copper	279	200	1,000	1,300P	200	NS	1300P	1300	NS	NS	1000	NS
Cyanide	70	100	200	200P	100	NS	200P	200	NS	750	200	NS
Iron	152,000	300(n)	NS	NS	300 (n)	NS	300(k)	NS	NS	NS	NS	NS
Lead	34.6	15(l)	0	15	25	50	0P	NS	NS	20 ug/day	50	NS
Magnesium	8330	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Manganese	16,100	300(n)	50	NS	300(n)	NS	50(k)	NS	NS	NS	NS	NS
Mercury	-	2	2	2	2	2	2	NS	NS	5.5	10	NS
Nickel	310	100P	15.4	100P	NS	NS	100P	100	NS	350	15.4	NS
Potassium	10,200	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	-	10	10	50	10	10	50	NS	NS	NS	10	NS
Silver	5.6J	50	50	NS	50	50	100(k)	NS	NS	NS	50	NS
Sodium	390,000J	20,000	NS	NS	20,000	NS	NS	NS	NS	NS	NS	NS
Thallium	5.7	2/1P(m)	17.8	2/1P(m)	NS	NS	NS	2/1(m)	NS	NS	17.8	NS
Vanadium	94.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Zinc	3,200	300	5,000	NS	300	NS	5,000(k)	NS	NS	NS	5000	NS

BEST AVAILABLE

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TABLE 2-2 Cont'd.

NOTES:

J - ANALYTE PRESENT. REPORTED VALUES MAY NOT BE ACCURATE OR PRECISE.

P - PROPOSED VALUE

NS - NO STANDARD OR GUIDELINE EXISTS

G - GUIDANCE VALUES

ND - NOT DETECTABLE

(a) SAFE DRINKING WATER ACT MAXIMUM CONTAMINANT LEVEL; NOVEMBER 1991

(b) 6 NYCRR PARTS 701 - 703 WATER QUALITY REGULATIONS FOR SURFACE WATER & GROUNDWATER; SEPTEMBER 1991

(c) NYS DRINKING WATER MCLs; STATE SANITARY CODE, PART 5, DATED JANUARY 1991

(d) SAFE DRINKING WATER ACT MAXIMUM CONTAMINANT LEVEL GOALS

(e) EPA DRINKING WATER HEALTH ADVISORIES, SUPERFUND PUBLIC HEALTH EVALUATION MANUAL, 1986

(f) EPA AMBIENT WATER QUALITY CRITERIA FOR PROTECTION OF HUMAN HEALTH ADJUSTED FOR DRINKING WATER ONLY (CONCENTRATIONS IN PARENTHESES CORRESPOND TO MIDPOINT OF RISK RANGE FOR POTENTIAL CARCINOGENS ONLY)

(g) CORRESPONDS TO AN INCREASED LIFETIME CANCER RISK OF  $1E-6$ . CALCULATED FROM SLOPE FACTORS PUBLISHED IN THE HEALTH EFFECTS ASSESSMENT SUMMARY TABLES (1991) AS FOLLOWS: REFERENCE CONCENTRATION =  $[1E-6 \times 70 \text{ KG}]/[\text{SLOPE FACTOR IN (MG/KG/DAY)} \times 2L/\text{DAY}]$

(h) TOTAL ORGANIC CHEMICALS CANNOT EXCEED 100 UG/L.

(i) PROPOSED FOR REVISION

(j) APPLIES TO EACH ISOMER INDIVIDUALLY

(k) SECONDARY MCL

(l) NO HUMAN HEALTH STANDARDS. THIS STANDARD IS FOR PROTECTION OF AQUATIC LIFE.

(m) TWO OPTIONS PROPOSED BY EPA RESULTING IN DIFFERENT STANDARDS.

(n) IF IRON & MANGANESE ARE PRESENT, THE TOTAL CONCENTRATION OF BOTH SHOULD NOT EXCEED 500 MG/L

(q) FORMULA TO DETERMINE STANDARD  $\text{EXP}(0.76 \ln (\text{PPM HARDNESS})) + 1.06$

## SECTION 3.0

### FORMATION AND DEVELOPMENT OF REMEDIAL ALTERNATIVES

#### 3.1 SITE RESPONSE OBJECTIVES

The purpose of remedial response is to practically achieve cleanup levels consistent with the most stringent site-specific ARARs. Site response objectives are site-specific, initial cleanup objectives that are established based on the nature and extent of contamination, the resources that are currently and potentially threatened, the potential for human and environmental exposures, and the possible future uses of the site. Based upon an initial analysis, remediation objectives for the Pasley site are listed in order of priority for each media:

##### A. Groundwater

- Prevent human contact with groundwater that is contaminated above that found in background conditions, or above the ARARs to be set by EPA for this site.
- Prevent or inhibit to the extent possible, migration of contaminants from the shallow aquifer to the deep aquifer
- Prevent or inhibit to the extent possible migration of contaminated groundwater beyond the plume area currently defined

##### B. Soil

- Prevent or limit migration of contamination to groundwater

Information from the Risk Assessment (ICF Technology, Inc., 1991) was used as the basis for clean-up levels. Table 2-2 identifies the clean-up levels for the groundwater.

##### 3.1.1 Estimate of Areas of Contamination and Volume of Contaminated Media

The estimate of the volume of contaminated groundwater was based on Figure 4-5 of the Remedial Investigation (RI) Report (Metcalf & Eddy (M&E), 1991).

The areal extent of the horizontal contamination is approximated by an ellipse with an area of 130,062 ft<sup>2</sup>. The depth of contamination was assumed to extend to 60 feet. Since the groundwater table is at 20 ft., the volume of soil which contains contaminated groundwater is 5,202,480 ft<sup>3</sup>. Using a porosity of 0.30 for the soil as calculated in the RI (M&E, 1991) the volume of contaminated groundwater is 11.7 million gallons.

The estimate of the volume of contaminated soil is based on the property boundaries and dimensions noted on the site survey which is in the RI (M&E, 1991). The estimate is also based on the results of the analyses of the soil. These results reveal that only the upper 2 feet of soil in the eastern portion of the site are contaminated and deeper contamination exists in the western portion of the site to a depth of 24 feet. For estimating purposes it has been assumed that contamination extends to a depth of 20 feet (the groundwater surface). The site is 83 feet wide and 210 feet long. Therefore, the total volume of soil which is contaminated is 12,910 yd<sup>3</sup>. Contaminated soil and groundwater calculations are presented in Appendix A.

### 3.2 GENERAL RESPONSE ACTIONS

General remedial response actions are developed to meet the site response objectives. These actions are listed below:

- . No Action
- . Institutional Controls
- . Groundwater Containment/Diversion
- . Groundwater Pumping/Treatment/Disposal
- . Soil (Source) Containment
- . Soil (Source) Excavation/Treatment
- . Alternative Drinking Water Supply

No-action is evaluated only as a baseline against which response actions can be measured.

expected to require a significant amount of time, and is expensive compared to off-site incineration for this quantity of soil. Permitting addresses a number of issues including air emission levels and residual concentrations of metals in incinerated soil. Disposal/treatment options for incinerated soil on-site will have to be proposed based on characteristics after incineration.

With on-site incineration, the risks and costs associated with transportation of hazardous materials to an off-site incinerator have been reduced. However, this process is very area intensive due to the space needed for a staging area, incineration equipment, treated soils staging area and the construction traffic during operation.

This technology is screened from further consideration.

#### 3.3.2.7 Soil Washing

Organic and inorganic contaminants can be removed from contaminated soils by a process known as "soil washing". Soil washing involves excavation of the contaminated soil and washing the soil in above-ground treatment units with water and/or various aqueous solutions to effect extraction of the contaminants.

Chelating agents can be used to remove metals from contaminated soils. A chelating agent commonly used in the soil washing process is ethylene diamine tetraacetic acid (EDTA). EDTA binds metal ions so that insoluble metal salts cannot form. After a reaction period to allow metals to desorb from the soils to the liquid phase, the soil-EDTA slurry is dewatered, and the decontaminated soil is placed back on-site or disposed of. The wastewater resulting from dewatering requires treatment to remove the metals extracted from the soil. Treatment of the wastewater typically includes metals precipitation from the liquid phase.

Soil washing using acid extraction can also be used for the removal of metals from contaminated soil. Acid is used to lower the pH of a soil slurry to extract metals from the soil matrix. The slurry is then settled and the supernatant is removed. The process can be repeated until the soil is

As required by the NCP, at least one remedial alternative will be developed as part of the feasibility study in each of the following categories:

- . Each alternative must meet the threshold requirements, compliance with ARARs, and overall protection of human health and the environment in order to be eligible for selection, unless a specific ARAR is waived.
- . As appropriate, alternatives that exceed applicable or relevant and appropriate public health or environmental standards.
- . As appropriate, alternatives that do not attain applicable or relevant and appropriate health or environmental standards but will reduce the likelihood of present or future threat from the hazardous substances must include an alternative that closely approaches the level of protection provided by the applicable or relevant standards and meets CERCLA's objective of adequately protecting public health, welfare, and environment.
- . A no-action alternative.

The no-action alternative is evaluated only as a baseline against which other alternatives can be measured. Based upon the technologies retained for inclusion into feasible alternatives, remedial alternatives applicable to specific contaminated media at the Pasley site are presented in Tables 3-2 and 3-3 for groundwater and soils, respectively.

TABLE 4-1. CRITERIA FOR INITIAL SCREENING  
OF REMEDIAL ALTERNATIVES

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Implementability

- Alternatives that are readily available and relatively easy to implement.
- Alternatives achieving the stated response objectives in a timely manner.
- Alternatives that rely on proven technologies.

Effectiveness

- Degree to which an alternative reduces toxicity, mobility, or volume through treatment.
- Minimizes residual risk and offers long term protection.
- Alternatives posing the least adverse impacts to the community, worker and the environment during implementation.
- Alternatives providing the largest reduction in risks for the greatest duration.

Cost

- Capital cost, including both direct and indirect costs.
  - Annual operation and maintenance costs.
  - Net present value of capital and O&M cost.
-



TABLE 5-1. ASSUMPTIONS AND LIMITATIONS TO THE  
DETAILED EVALUATION OF PASLEY SITE  
REMEDIAL ALTERNATIVES

- 
- a) The no action alternative forms the baseline for evaluating all other alternatives and is considered to be the Pasley site as it currently exists. Post closure groundwater monitoring and maintenance is required component of the no action and all other alternatives.
  - b) Groundwater at the Pasley site will be cleaned up to Federal and State MCLs, as outlined in Table 2-2.
  - c) Groundwater contamination from the Pasley site is assumed not to exceed 60-feet below the ground surface.
-

1. Federal OSHA and State worker health and safety standards and guidance must be strictly adhered to during all phases of remediation. This includes worker training and implementation of an adequate health and safety program (40 CFR 300.38).
2. Proper closure and post-closure care must be implemented including: decontamination of all treatment or disposal equipment used or exposed during remediation; written post-closure plan and specified monitoring, maintenance, inspections, and corrective responses for a minimum of 30 years, unless otherwise specified by NYSDEC; and restoring the site area to as natural condition possible by the alternative (40 CFR Part 264 Subpart G and 6 NYCRR Part 360).
3. The alternatives proposing treatment of contaminated soils must meet the substantive requirements of RCRA (40 CFR Part 264).
4. Implementation of security, inspections, operation and maintenance, preparedness and prevention, contingency plans and emergency procedures (40 CFR 264 Subparts A through D and 6 NYCRR Part 370).
5. A survey plat must be filed with the local zoning authority and the Nassau County Clerk indicating the locations and dimensions of hazardous waste disposal units on-site. Further, a notation in the deed for the Pasley site parcel must be inserted recording that the land was used to manage hazardous wastes (6 NYCRR Section 373-2.7).
6. The remedial actions will be conducted in compliance with the New York Environmental Conservation Laws.
7. The New York Uniform Procedures Act, which applies to Pasley site remedial action permitting, provides standardized procedures for permit submittal and NYSDEC review.

#### 5.3.4.3 Reduction of Toxicity, Mobility and Volume

The extraction wells would control the mobility of the contaminants. The metals treatment will reduce the toxicity and volume of metals in the groundwater. Increase volume of sludge will be generated from the metals removal and GAC system. These sludges will be transported off-site for disposal. The emissions from the air stripping system will be treated by the fume incinerator and the scrubber, thus reducing the toxicity of air emitted to the environment.

#### 5.3.4.4 Implementability

These types of water treatment facilities are commonly used at many treatment plants and other chemical processing plants and implementation of such a system at the Pasley site should not present any difficulty.

The treatment system will require construction of a process support pad. This support pad will require adequate structural support and road access for the treatment equipment as well as utility hook-ups such as telephone, electricity, water and sewer. Design and construction of this support area will be planned in conjunction with any other remediation activities at the site such as excavation.

There is sufficient area on-site to accommodate each of the technologies included in this alternative. However, the tight constraints of the working area available for construction activities may lengthen the time of installation of the system since additional care and precaution will be necessary during the operation of heavy equipment.

The influent (contaminated groundwater) to the proposed treatment facility is a listed hazardous waste under NYSDEC hazardous waste management regulations (6 NYCRR Part 371). Construction and operation of the treatment facility must be in compliance with NY facility standard for hazardous waste treatment, storage or disposal facilities 6 NYCRR Section 373-2).

Sludges generated during the chemical precipitation step of treatment and spent carbon generated by carbon absorption may contain sufficient quantities of metals and organics respectively to characterize the waste as hazardous. A fully-permitted RCRA disposal facility that will accept the metal-containing sludge from the Pasley site has not been identified as part of this study; however, commercial RCRA landfills commonly accept wastewater sludges for disposal and it is not anticipated that this issue will significantly impact the implementation of a treatment alternative.

Residues (i.e., spent carbon or sludge) generated during the treatment process will be temporarily stored on-site while awaiting off-site transport and disposal. Residues will not be stored for more than 90 days. The wastes must be stored in compliance with interim status standards for storage tanks (40 CFR Part 265 Subpart I and 6 NYCRR Sections 373-3.9, 373-3.10).

RCRA regulates the off-site transport of hazardous wastes through the adoption of certain DOT regulations. RCRA hazardous waste transport regulations are specified under 40 CFR Part 263 and 6 NYCRR Part 372 and encompass transporter identification numbers, manifests, recordkeeping and hazardous waste discharges during transport. The off-site transport of hazardous residues from the Pasley waste site will be in DOT-approved transport containers by a commercial hauler having an EPA transporter identification number. In this manner, the off-site transporter will be performed in compliance with applicable requirements.

In accordance with the NCP, off-site disposal of hazardous wastes removed from hazardous waste sites must be to facilities that are fully permitted under appropriate Federal and State regulations. Hazardous residues transported off the Pasley site must be disposed of in such a facility.

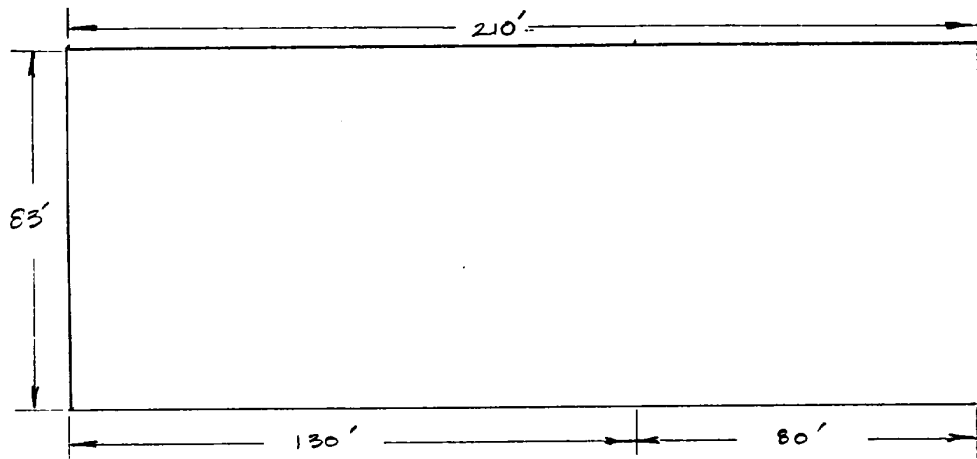
Under Section 402 of the Clean Water Act, the Federal government has authority to regulate wastewater discharges through the NPDES program (40 CFR Part 415, Subpart F). The State of New York is authorized to administer the NPDES program at the State level. The discharge of treated process effluent will require a SPDES permit issued by NYSDEC. The State approval process for the permit application is expected to take approximately 6 to 12 months.

Project PERLEY SOLVENTS AND Acct. No. Appendix H Page 1 of 1  
 Subject CHEMICALS Comptd. By R ROTH Date 4/9/92  
 Detail \_\_\_\_\_ Ck'd. By \_\_\_\_\_ Date \_\_\_\_\_

NONREPRODUCIBLE GRID FORM 143

METCALF & EDDY, ENGINEERS

# PLAN VIEW



SCALE: 1" = 40'

ASSUME SOIL IS CONTAMINATED TO A DEPTH OF 20'  
 (GROUNDWATER TABLE)

$$V = 210 \text{ FT} \times 83 \text{ FT} \times 20 \text{ FT}$$

$$= 34860 \text{ FT}^3 \text{ (12911 YD}^3 \text{ - SAY 12910 YD}^3 \text{)}$$

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